SEE FOLLOWING NOTE

PARTS OF THE ORIGINAL DOCUMENT

ARE OF POOR REPRODUCTIVE QUALITY

CERTAINES PARTIES DU DOCUMENT ORIGINAL

SONT DE PIÈTRE QUALITÉ DE REPRODUCTION

Canadian Agricultural Policy and Prairie Agriculture

Murray Fulton
Ken Rosaasen
Andrew Schmitz

A study prepared for the
Economic Council of Canada 1989

The Economic Council of Canada is an independent advisory body with broad terms of reference to study, advise and report on an extensive range of matters relating to Canada's medium- and long-term economic development. The Council is a Crown corporation consisting of a Chairman, two Directors and not more than twenty-five Members.

The Council as a corporate body bears final responsibility for the contents of the *Annual Review* and of certain other publications which are clearly designated as *Council reports* or *Council statements*. The Council also publishes other material, which is clearly attributed to individual authors rather than to the Council as a whole. These publications fall into four categories: *research studies*, which are concerned with subjects of wide general interest; *technical papers*, which are concerned with technical subjects of interest to specialists in their particular field; *discussion papers*, which report on work in progress or on topics of interest to a specialized reading audience for purposes of professional discussion; and *conference proceedings*. While the Council establishes general policy regarding these four categories, it is the Chairman of the Council who bears final responsibility for the decision to publish them under the imprint of the Council.

The Chairman, in reaching a judgment on the competence and relevance of each author-attributed study or paper, is advised by the two Economic Council Directors. In addition, for authored research studies and technical papers the Chairman and the two Directors weigh the views of expert outside readers who report in confidence on the quality of the work. Publication of an author-attributed study or paper signifies that it is deemed a competent treatment worthy of public consideration, but does not imply endorsement of conclusions or recommendations by either the Chairman or Council Members.

Canadian Agricultural Policy and Prairie Agriculture

Canadian Cataloguing in Publication Data

Fulton, Murray E.

Canadian agricultural policy and Prairie
agriculture

Issued also in French under title: La politique
agricole canadienne et les Prairies.
ISBN 0-660-13129-3
DSS cat. no. EC22-159/1988E

1. Agriculture – Economic aspects – Prairie
Provinces. 2. Agriculture and state –
Prairie Provinces. 3. Grain trade –
Economic aspects – Prairie Provinces.
4. Agricultural credit – Prairie Provinces.
I. Rosaasen, Kenneth A. II. Schmitz, Andrew.
III. Economic Council of Canada. IV. Title.

HD1787.F84 1989 338.1'8712 C89-097050-5

MURRAY FULTON
KEN ROSAASEN
ANDREW SCHMITZ

Canadian Agricultural Policy and Prairie Agriculture

The findings of this study are the personal responsibility of the authors and, as such, have not been endorsed by the Members of the Economic Council of Canada.

89-05779/

© Minister of Supply and Services Canada 1989

Available in Canada through

Associated Bookstores
and other booksellers

or by mail from

Canadian Government Publishing Centre
Supply and Services Canada
Ottawa, Canada K1A 0S9

Catalogue No. EC22-159/1988E
ISBN 0-660-13129-3

Contents

Acknowledgment ix

Foreword xi

1 Introduction 1

2 The Export Nature of Prairie Agriculture 5
  The Evolution of Prairie Agriculture 5
  Prairie Agriculture and Trade 7
    Grains 7
    Livestock 9
  Summary 9

3 The Crisis in Prairie Agriculture 11
  Debt and Income 11
    Example 1 13
    Example 2 13
  Summary 14

4 Characteristics of Prairie Agriculture 15
  Capital Intensity 15
  Increasing Specialization 18
  Rural Infrastructure 20
    Farm Structural Characteristics 20
    Community Structure 23
  Summary 23

5 Falling Prices, Volatility, and Farm-Asset Values 25
  The Declining Real Price of Wheat 25
  Volatility in Agriculture 25
  Farm-Asset Values 26
  Summary 28

6 Canadian Agricultural Policy 29
  Government-Policy Intervention 29
    Public-Interest Intervention 29
    Rent-Seeking Intervention 30
  Criteria for Policy Evaluation 30
    Reducing Asset-Price Fluctuation 30
    International Agricultural Markets 31
    Income Distribution 32
    Spinoff Effects 32
  Summary 33

7 **Canadian Agricultural Programs: An Overview** 35
Western Grain Transportation Act 36
Western Grain Stabilization Act 37
Crop Insurance 38
Special Canadian Grains Program 39
Two-Price Wheat 39
Agricultural Credit 40
Other Programs and Policies Affecting Prairie Agriculture 40
  Cash Advances 40
  Red-Meat Stabilization Programs 40
Summary 41

8 **Canadian Agricultural Programs: The Effects** 43
Western Grain Transportation Act 43
  Resource Allocation 43
  International Arena 50
  Farm Income 50
  Income Distribution 51
  Land-Price Fluctuations 52
  Economic Spinoffs 53
Western Grain Stabilization Act 53
  Resource Allocation 53
  International Arena 55
  Farm Income 56
  Income Distribution 57
  Land-Price Fluctuations 57
  Economic Spinoffs 58
Special Canadian Grains Program 59
  Resource Allocation 59
  International Arena 60
  Farm Income 60
  Income Distribution 60
  Land-Price Fluctuations 60
  Economic Spinoffs 60
Crop Insurance 62
  Resource Allocation 62
  International Arena 62
  Farm Income 62
  Economic Spinoffs 62
Two-Price Wheat 63
  Resource Allocation 63
  International Arena 65
  Farm Income 65
  Income Distribution 65
  Land-Price Fluctuations 65
  Economic Spinoffs 65
Agricultural Credit 65
  Resource Allocation 65
  International Area 66
  Farm Income 66

Income Distribution 66
Land-Price Fluctuations 67
Economic Spinoffs 68
Summary 68

9 The Aggregate Impact of Canadian Agricultural Programs on Debt and Income 69
Debt and Income 69
Agricultural Output 74
Canada 74
United States and the European Community 76
Summary 76

10 The Implications for Canadian Agricultural Policy 79
Debt and Income 79
Canadian Agricultural Policy and International Agriculture 80
GATT and Agricultural Trade 81
Summary 83

Appendixes

A Multiplier Analysis 87

B Market Dynamics, Expectations, and Asset Values 89

C A Theoretical Analysis of Canadian Agricultural Policy 93

Notes 107

List of Tables and Charts 117

Acknowledgment

The authors would like to thank everyone who has assisted them in the preparation of this report. In particular, they would like to acknowledge the help and advice of the Advisory Committee who provided many useful comments on early versions of the study. On many occasions they supplied the direction that the report needed. In the later stages of the report, the authors benefited from the reading by John Graham and Clay Gilson. Julia Taylor provided much of the material in Appendix A. Detailed comments and suggestions by Gary Storey proved to be invaluable in providing the focus the report required during the final drafts. Finally, the authors would like to extend their sincere appreciation to Caroline Pestieau of the Economic Council of Canada who carefully edited numerous drafts and generally oversaw the development of the report. The report is much better as a result of her efforts. As always, the usual caveats apply.

Foreword

This study was undertaken as part of the Economic Council's project on the Future of the Prairie Grain Economy – a project referred to the Council by the Prime Minister in a letter dated March 31, 1987.

> I am encouraged to see the Council proposing a significant collaborative effort with federal and provincial governments and the private sector. I am pleased to support this particular study as a vehicle for public debate on a pressing problem which concerns us all, the future of the Prairie grain economy. I expect it to produce an invaluable exchange of information, while leaving the Council, as always, to its own independent views, conclusions, and recommendations.

This study examines the crisis of Prairie agriculture in the 1980s with particular attention to the build-up of farm debt. It reviews the major programs the federal government has used in recent years to support Prairie grain farmers. The authors investigate the role these programs played in aggravating and in alleviating the crisis and look at their overall effects on the Prairie farm sector.

The Council received financial support for this project from the governments of Saskatchewan and Alberta, Agriculture Canada, The Prairie Pools Incorporated, Cargill Limited, and the Royal Bank of Canada. Representatives of these organizations, as well as independent experts, gave generously of their time to attend meetings of the project's Technical Advisory Committee. The Council is glad to acknowledge this valuable support.

Other studies in this series deal with the international supply and demand of wheat, coarse grains, and canola, Canadian policy towards Prairie agriculture, the effects of the cost-price squeeze on Prairie farms, and the opportunities for diversifying agriculture in the Prairie provinces. The Council put forward its recommendations for improving public policy regarding Prairie agriculture in a Statement published in November 1988.

Andrew Schmitz of the University of California, Davis, and the University of Saskatchewan was director of research for this study and one of its authors. Murray Fulton and Ken Rosaasen are members of the Faculty of the Department of Agricultural Economics of the University of Saskatchewan. Murray Fulton is also an associate of the Centre for the Study of Cooperatives.

Judith Maxwell
Chairman

1 Introduction

The Prairie agricultural crisis of the mid- through late 1980s – one of the worst in Canadian history – is a sharp reminder of the volatility of the agricultural industry. Dramatically fluctuating grain and livestock prices, changing weather conditions, uncertain export markets, sharp changes in interest rates, and a fluctuating land market have made agricultural production extremely risky.

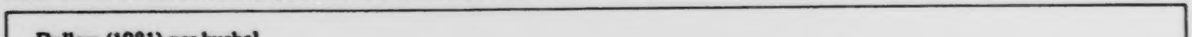
As with previous crises, this one occurred largely because of the collapse of world grain prices, although the droughts of 1985 and 1988 also contributed. Real grain prices in 1987 were lower than they had ever been, even lower than during the most well-known crisis – the Great Depression (Chart 1-1). The situation, however, has not always been one of doom and gloom. During the 1970s, wheat prices were at the highest level since the Second World War; the grain industry in the Prairies was booming; input suppliers were expanding rapidly; and general prosperity appeared to reign.

The optimism of the time, fueled by credit, created a buoyant land market. Between 1971 and 1981, the real value of farmland and buildings in the Prairies tripled (Chart 1-2). Falling grain prices in the 1980s, however, led to falling incomes (Chart 1-3); that, in turn, led to the 50-per-cent drop in the value of farmland and buildings that occurred between 1981 and 1987 (Chart 1-2). As discussed later, this sharp rise and fall in asset values is one of the reasons that Prairie agriculture is in a crisis.

The boom-and-bust cycles of the grain sector have created a high degree of uncertainty for the livestock sector. In 1987, for instance, livestock producers in the Prairies did well economically, because the principal input – feed grain – was at a record low price. The exact opposite was the case a decade earlier, when the livestock industry suffered substantial losses as the result of high grain prices and reduced demand for red meat. At that point, the livestock industry

Chart 1-1

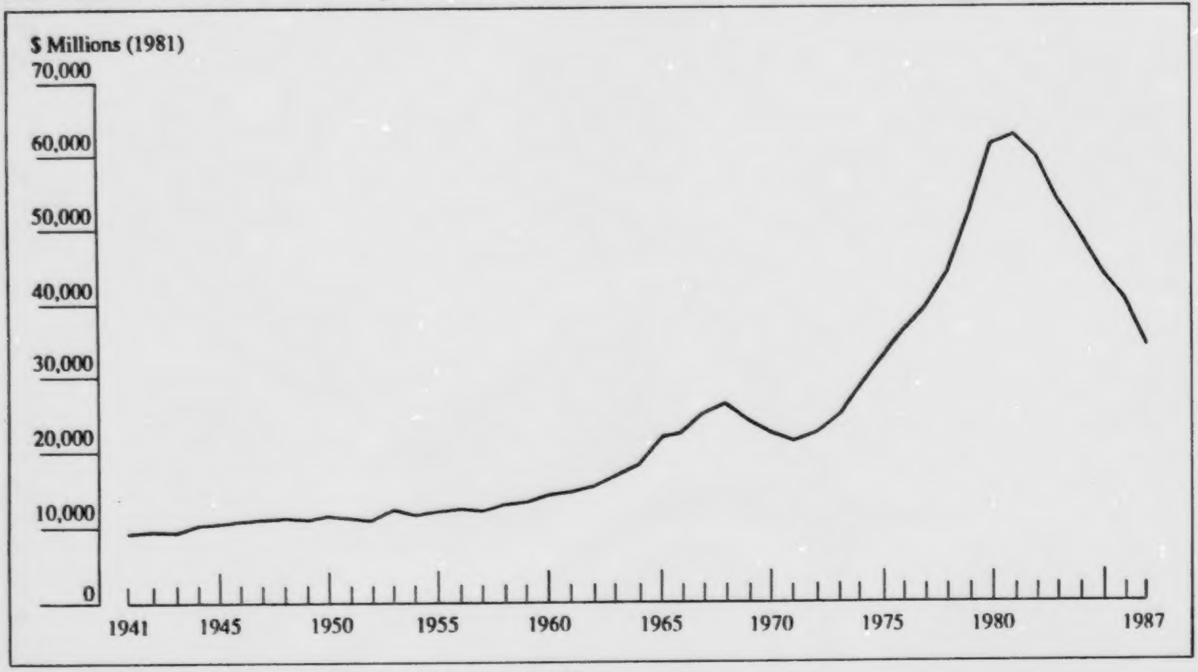
Real Farm Price of Wheat, Prairie Provinces, 1926-87



Source Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 1-2

Real Value of Farmland and Buildings, Prairie Provinces, 1941-87



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

was in trouble, and farmers and ranchers sold off their cattle and hogs in an effort to get out of livestock production.

The boom-and-bust cycles and the resulting uncertainty that agriculture faces are, in large part, due to the Prairies' reliance on export markets. Over 85 per cent of Prairie wheat production, for example, is exported.[1] Export markets are highly volatile: inelastic supply and demand, changing weather conditions, fluctuating currencies and interest rates, major changes in the health of the world economy, and most importantly the internal policies of the major trading countries, all contribute to the volatility.

The problems and opportunities facing Prairie agriculture have been examined a number of times, usually within the context of a study of Canadian agriculture. In all of the cases, the studies and their policy recommendations reflected the health of the agricultural industry at the time they were undertaken. The most comprehensive review of agriculture in Canada since the late 1960s was that of the 1969 Federal Task Force on Agriculture. The Task Force was commissioned to examine the crisis facing Canadian agriculture at the end of the 1960s. Among its recommendations were proposals for price and production stabilization programs, which, as will be noted, formed the basis for a number of the agricultural programs currently in place in Canada.

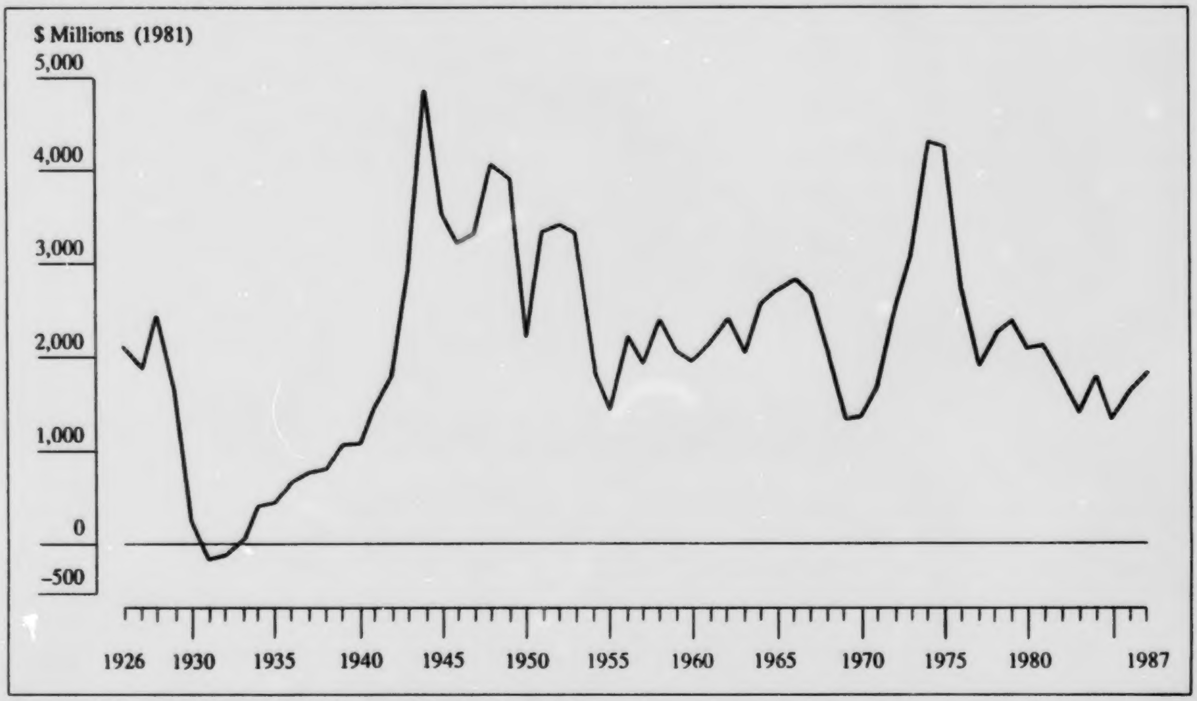
A decade later, the 1979 Agri-Food Strategy outlined the following goals for agriculture: 1) market development; 2) strengthening of the supply base; and 3) mission-oriented agricultural research.[2] This review of Canadian agricultural policy came at a time when the outlook for agriculture was extremely positive. The Agri-Food Strategy's recommendations reflected that optimism – the problem was seen as one of how to expand production and get it to market.

In 1985, the National Agricultural Strategy was initiated by the provincial premiers in an attempt to develop a consensus on some of the major problems facing Canadian agriculture at that time. Mounting agricultural protectionism around the world led the premiers to recommend a much more market-oriented agricultural industry that would be supported by government involvement in research, resource conservation, market development, and downside risk sharing with producers.

In 1987, the crisis in Prairie agriculture prompted the Prime Minister to ask the Economic Council of Canada to

Chart 1-3

Real Realized Net Farm Income, Prairie Provinces, 1926-87



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

undertake a study on "The Future of the Prairie Grain Economy." Our study, entitled *Canadian Agricultural Policy and Prairie Agriculture*, is one of several commissioned by the Council as background for its final report. By design, this study is not intended to cover all aspects of Prairie agriculture. For instance, questions concerning the future demand, supply, and price of grains and oilseeds in the world market, although extremely important to the future of Prairie agriculture, are examined in a separate study.[3]

One of the primary causes of the crisis – the world "grain-trade war" – is dealt with in a second study. That study also considers Canada's role in the international market and the impact on Prairie agriculture of world grain-trade liberalization.[4] The major cost and price trends in Prairie agriculture are examined in a third study, which also considers the financial stress under which farmers in the region are operating.[5] Together, those studies also serve as a background for the analysis undertaken in this document.

The primary purpose of this study is to define the crisis in Prairie agriculture and to evaluate the past impact of Canadian agricultural policy. More specifically, the objectives of this study are to:

- describe and highlight the key economic characteristics of Prairie agriculture;
- define the crisis facing Prairie agriculture in terms of income and debt;
- explain how the boom of the 1970s has contributed to the crisis of the 1980s by influencing the level of debt in the Prairies;
- review and document the major agricultural programs affecting Prairie agriculture;
- determine the impact of those programs on the crisis and the health of the agricultural industry; and
- suggest options to deal with both the current crisis and the future viability of the Prairie agricultural sector.

As background research for the recommendations made by the Council, this study will not discuss policy options. The authors, however, have made policy recommendations on this subject elsewhere.

In discussing the future of Prairie agriculture and any program redesign deemed necessary to deal with the crisis, the programs and the magnitude of the government transfers in place in the late 1980s are important to bear in mind. These programs, along with the nature and characteristics of the world grain market, the levels of income and debt, the export orientation of Prairie agriculture, and the capital intensity of the industry, provide the "initial conditions" upon which the problem is discussed. These conditions are important, since they provide some indication of the feasibility of pursuing alternative farm programs and strategies.

For example, while an international subsidy-free agricultural industry may be highly desirable, it is unlikely to happen tomorrow. The co-operation of many different countries is necessary to achieve that result, and not all may find a subsidy-free agricultural industry to be in their best interests. Even if such a change would be generally beneficial, countries might be unwilling to pursue it immediately, since that would mean shifts in bureaucracies and losses to groups that would have to be compensated or appeased in some manner.[6] Similar processes are at work in Canada, and those must be recognized before any substantial change can occur here. Understanding the current situation helps to acknowledge the constraints and limitations.[7]

This study proceeds as follows. Chapter 2 examines the export nature of Prairie agriculture, the inherent volatility of the export market, and the importance that it has for the industry. Chapter 3 highlights the important features of the crisis facing Prairie agriculture and explicitly links those to the underlying volatility of an export-oriented agricultural industry. Chapter 4 illustrates some added dimensions of Prairie agriculture, including trends in farm capitalization, farm size, and grain and livestock output and specialization. Chapter 5 presents a framework to aid in the understanding of the changes that have been occurring in Prairie agriculture. Special attention is paid to the relationship between farm income and farm-asset values, and the degree to which governments can affect those variables through agricultural policies and programs.

Chapter 6 outlines some of the reasons for government involvement in agriculture and develops the criteria with which to evaluate agricultural programs. A description of the major programs affecting Prairie agriculture in the 1980s is provided in Chapter 7. This is done separately from any analysis of the programs, so that those readers who wish to acquaint themselves with the basic features of Canadian agricultural policy can do so quickly and easily. Chapter 8 analyzes the impacts of agricultural policies, on a program-by-program basis. The aggregate impact of Canadian agricultural programs on Prairie agriculture is examined in Chapter 9. Chapter 10 summarizes the main results of the study and outlines the constraints these impose upon agricultural policy makers and the agricultural industry.

2 The Export Nature of Prairie Agriculture

Understanding the nature of Prairie agriculture and its reliance on the world export market requires a knowledge of the historical evolution of the Canadian agricultural economy. The mix of resources in the various provinces, the location of markets, the attitudes of farmers, climatic factors, technological and economic changes, and the regulatory policy environment have all played a part in shaping Prairie agriculture.

The Evolution of Prairie Agriculture

Prairie agriculture had its beginnings in the 1880s. At that time, the major activity in the region was cattle ranching. High transportation costs and poor world economic conditions made the growing of grain for export a marginal activity. The economics of grain-growing in the Prairies, however, soon changed with technological advancement, alterations in government policy, and changing world economic conditions. The introduction of steamship transport, which resulted in a dramatic drop in ocean freight rates, and the building of the railway meant that grain from the Canadian Prairies could now be sold competitively in the major markets of Great Britain and Germany. Improved economic conditions in Europe in the late 1890s increased the export demand for wheat, while the experimental stations established by the federal government assisted in the development of drought-resistant wheat varieties that were better suited for the western Canadian climate.

Settlement of the Prairie region was also encouraged, in an attempt to unite, economically and politically, the vast country that had been formed in 1876. Two of the major tools for that task were the active encouragement of settlement in the West and the industrialization of Canada through the use of tariff protection. In fact, they were not unrelated, since the encouragement of economic activity in the West was to increase the demand for goods and services supplied by the protected manufacturing plants of central Canada.[1] Fowke argues that while this policy initially aided the development of western Canada, over time it meant that the region was less able to develop an industrial sector and diversify its economy away from the production of raw materials. The importance of this point is that while Prairie agriculture has received substantial transfers from the federal government during the 1980s, that was not always the case. In fact, throughout a large part of Canada's history, the portion of agricultural income attributable to government programs was very small.[2]

Although livestock production has always been an important economic activity in the Prairies, by the 1920s wheat had become "king." Canada became known as the "bread basket of the world," accounting for over 35 per cent of world wheat exports. The demand at the end of the First World War for a government selling agency, and when that did not materialize, the drive to form the wheat pools, are indicative of the importance that Prairie farmers attached to the export market and of their desire to ensure the highest possible return from what they saw as their primary market.

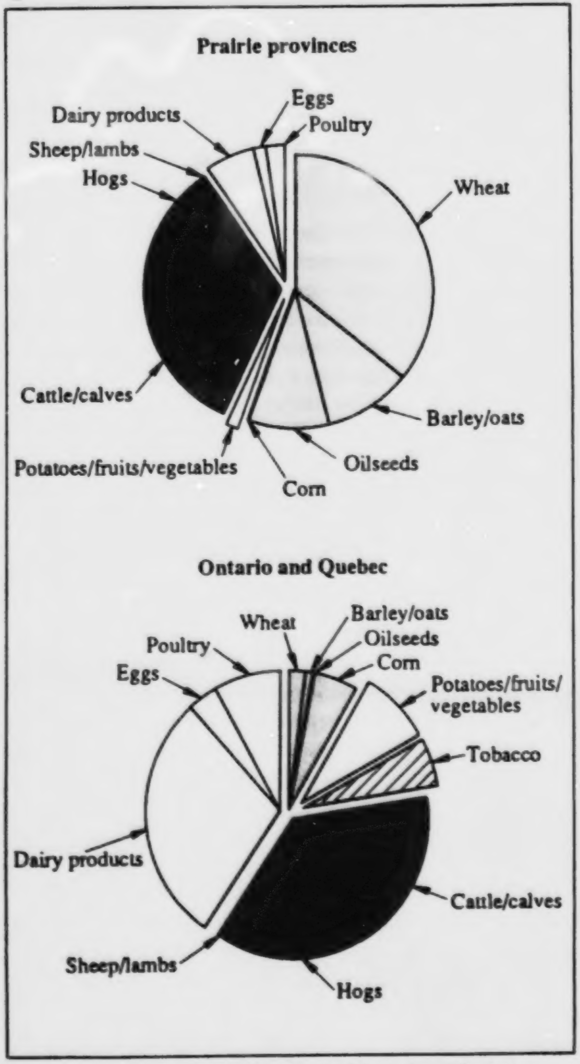
At the same time that western Canadian agriculture was developing an export thrust, central and eastern Canadian agriculture was evolving to serve the local domestic market. The first settlers to those regions were threatened by starvation if food supplies should be lost en route from Europe; thus self-sufficiency in food production became a necessity. As the population of the regions grew, the markets for farm products also increased. Since the agricultural resource base was not large relative to the size of the local market, the tendency was for farmers to produce a wide assortment of farm products for local consumption.

The result of those very different starting points is illustrated in Chart 2-1, which compares the source of farm cash receipts in the Prairies with that in Ontario and Quebec. Over 50 per cent of the cash receipts in the Prairies originate from commodities that are export-oriented: wheat, barley, oats, and oilseeds. The opposite is true for Ontario and Quebec, where the majority of cash receipts are from commodities whose primary market is domestic: dairy products, poultry, eggs, corn, potatoes, fruits, and vegetables. Both regions also receive a substantial portion of their cash receipts from livestock, a commodity that is both exported and domestically consumed.

As Canadian agriculture evolved, a dichotomy developed. Farmers in western Canada were, and continue to be, more export-oriented, whereas those in other regions are more domestically oriented. Traditionally, the Prairies also imported many of the inputs required in agriculture. In the early

Chart 2-1

Cash Receipts from the Sale of Selected Farm Commodities, Ontario and Quebec, and Prairie Provinces, 1986



Source Agriculture Canada, *Handbook of Agricultural Statistics*.

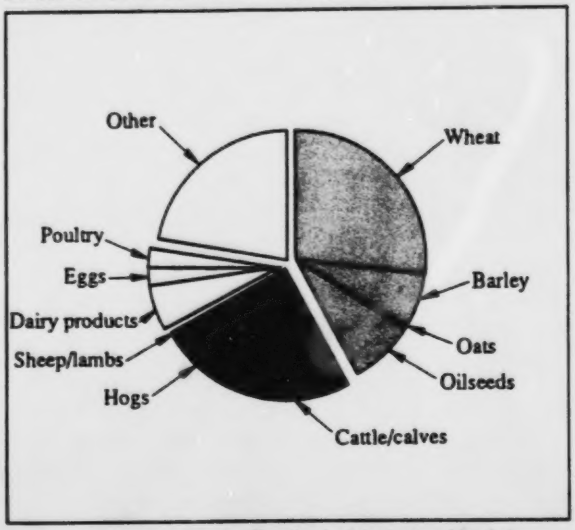
years, ploughs and barbed wire were imported; later on, it was machinery and automobiles. Thus trade was, and still is, important with respect to both inputs and outputs.

The export markets for products such as wheat and canola are much more volatile than the domestic markets for commodities like eggs, poultry, and dairy products. Weather fluctuations in other countries, changes in the level of world economic activity, and the domestic policies of other major importing and exporting countries, all contribute to the tremendous swings that have been seen in the export markets. On the domestic front, however, the existence of supply management for the poultry and dairy industries has reduced those fluctuations.[3] The result is that Prairie agriculture's dependence upon export markets has been translated into a higher level of risk and uncertainty for the farmers and economies of that region.

The Prairie region is not homogeneous with respect to its economic activity. Manitoba, Saskatchewan, and Alberta have very different agricultural production mixes. For example, Alberta derives a much higher percentage of its farm cash receipts from livestock than does Saskatchewan or Manitoba, while Saskatchewan remains highly dependent upon grain and oilseed production (Charts 2-2, 2-3, and 2-4). In addition, the agriculture of both Manitoba and Alberta is more diversified than that of Saskatchewan, in that they have a greater percentage of commodities like dairy products, eggs, and poultry. The reasons for this geographic diversity of production are many. In the case of livestock feeding, production has appeared to shift to Alberta because of such factors as feed supply and cost, marketing infrastructure, feed-lot management, and government support.[4]

Chart 2-2

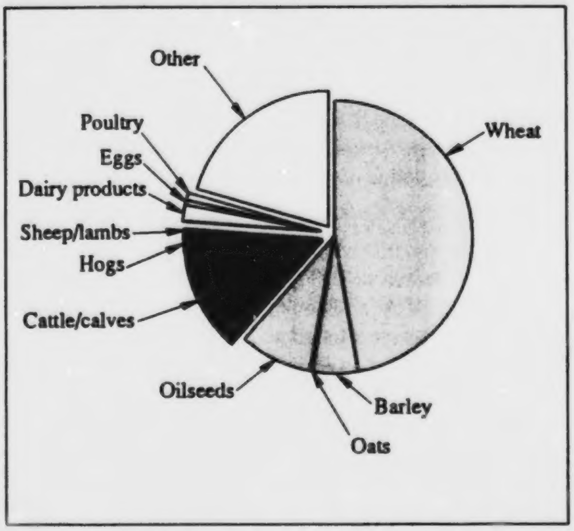
Average Cash Receipts from the Sale of Selected Farm Commodities, Manitoba, 1983-87



Source Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 2-3

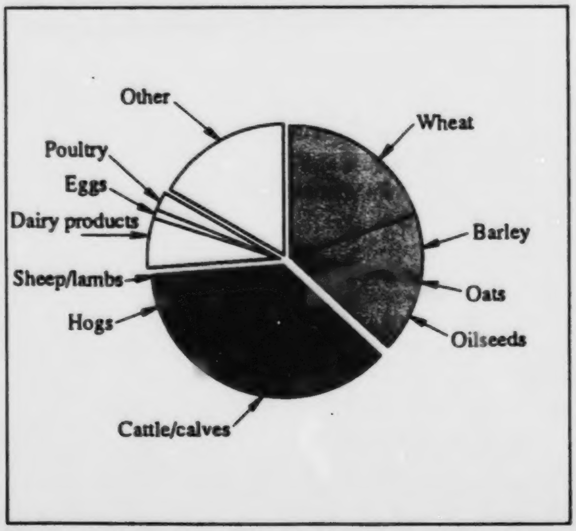
Average Cash Receipts from the Sale of Selected Farm Commodities, Saskatchewan, 1983-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics.*

Chart 2-4

Average Cash Receipts from the Sale of Selected Farm Commodities, Alberta, 1983-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics.*

Prairie Agriculture and Trade

Grains

The grain export markets upon which the Prairies heavily rely have changed dramatically since Prairie settlement began, mainly because of two factors: 1) technological change; and 2) the domestic policies of exporting and importing nations.[5] As a consequence of these forces, the growth in supply has tended to exceed the growth in demand, leading to a downward trend in real grain prices and a continuation of market volatility.[6]

Chart 1-1 showed real Canadian wheat prices at the farm level since 1926. These prices are very unstable and follow a downward trend. The decline in real prices is primarily the result of technological change: improvements in yield, crop hardiness, and resistance to diseases and pests. These technological improvements were first adopted in the major exporting countries like Canada and the United States as early as the turn of the century. More recently, they have been taken up by industrial and Third World importing countries. For example, over the last 10 to 15 years, China has doubled its wheat production, making that country the largest wheat producer in the world in 1987. Significant production increases have also occurred in India, Pakistan, and the European Community (EC), switching their status from traditional importers to net exporters.

The continuing volatility of the world grain market is a result of many factors: an inelastic demand for grain, year-to-year changes in weather, fluctuating global economic activity, and the domestic policies of the major grain traders. The last factor is extremely important. The world grain market is far from being perfectly competitive; instead, it is highly regulated, with many of the world's producers receiving high price supports. The main reason for the low grain price in the 1980s is the overproduction of grains in the world – an overproduction that is significantly influenced by the domestic policies of the major grain-producing nations.

To highlight the importance of protectionism, consider Europe. At one time, Europe was a major importer: Great Britain and Germany were traditionally Canada's largest wheat customers. The EC is now a major grain exporter. In fact, in the 1988/89 crop year, the EC may well overtake Canada as the second largest world wheat exporter. The major reason behind this production increase is the Common Agricultural Policy (CAP), which was introduced in the early 1960s. The CAP establishes an internal price in the EC, which has generally been set above the level of the world market price. Countries and traders wishing to sell grain to the EC pay a levy, effectively bringing the price of imported goods up to the internal price. In response to the higher support price, farmers have adopted yield-increasing technologies and have applied greater levels of inputs. As a result, wheat production in the EC nearly doubled in the period 1970-87.[7]

Other countries around the world also heavily subsidize their producers. For example, agricultural prices in Japan throughout the 1980s were at least five times higher than those in Canada.[8] Although such policies create stability for domestic producers, they generate instability in export markets. In short, the internal policies of regions like the EC and Japan insulate their agriculture from world market forces and, by so doing, generate export instability and lower prices for countries such as Canada and Australia.

In spite of the production changes occurring in Europe and the Far East, the United States remains the major force in international agricultural trade. Indeed, its policy and output thrust has been markedly different from that elsewhere in the world. In the 1950s and 1960s the United States took action to reduce production. They did so by introducing stockholding programs and by offering to pay producers a target price (which was generally above the world price) if they removed a portion of their land from production. Partly because of those policies and programs, the 1950s and 1960s were periods of relative stability (see Chart 1-1).[9]

During the price boom of the early 1970s, this set-aside land was brought back into production as U.S. farmers, like their counterparts elsewhere in the world, responded to the increased demand for grain. The higher prices, combined with the increased acreage, led to a substantial increase in grain production in the United States, with the result that the U.S. share of the world market expanded considerably. Because of falling world prices in the early 1980s, however, the United States, through the 1981 farm bill, reverted to its previous policy of target prices and acreage set-asides.[10]

The 1981 farm bill curtailed U.S. output at the same time that the EC and other countries were increasing their output. The result was a dramatic loss of market share for the United States relative to its peak market share at the end of the 1970s. Although the country was willing to forgo its market share for a period of time in order to realize a higher world price, it was unwilling to play such a strategy forever. In short, the United States was not prepared to see other producing countries, and especially the EC, gain as a result of its policy.

In an effort to reduce its stocks and to gain market share, the United States, in its 1985 farm bill, decreased its loan rate.[11] The resulting drop in the world price of roughly C$1.30 per bushel (the U.S. loan rate having been lowered from US$3.40 per bushel to US$2.40 per bushel) had a devastating effect on Prairie agriculture.[12] To make matters worse, the United States introduced export subsidies through the Export Enhancement Program (EEP) so that it could subsidize export sales to targeted countries below the US$2.40-per-bushel level. The EEP has been used extensively by the United States in an effort to reduce their level of grain stocks and to gain back the market share lost to other exporting countries.[13]

It has been argued that the decision by the United States to reduce the loan rate was at least partly the fault of producing countries outside the United States. By continuing to expand exports through high internal prices and export subsidies, at a time when the United States was reducing its output and increasing stocks in order to hold the world price up, producers like the EC effectively forced the United States to alter its strategy. The EC responded to the U.S. action, not by cutting back output but by increasing the size of its export subsidies. That has resulted in what is called "the grain-trade war." It has also been called a competitive strategy on the part of the countries involved, since they have all attempted to regain, or retain, market share by lowering the price at which they would be willing to sell.

Prairie agriculture, because of its export orientation, has to compete in the same environment. Without government support, however, it cannot function alongside the heavily subsidized production and exports of the other major trading countries. While the problem is one of too much production, it is not in Canada's interests to cut production and export sales unless others do likewise, since lack of market power on Canada's part means that any reduction in production or exports will only make Canada worse off. While financial support for Canadian farmers may signal to other countries that Canada is unwilling to assist in solving the oversupply problem, it also signals that Canada is not prepared to give up its agriculture without a fight.

Canada recognizes that it is costly to provide government transfers to Prairie agriculture. It has therefore had a high profile in promoting agricultural trade liberalization, since Prairie agriculture can compete in a free-trade market. As a member of the Cairns Group, which is promoting trade liberalization in agricultural products, Canada has been instrumental in having agricultural trade explicitly included in the Uruguay Round of the General Agreement on Tariffs and Trade discussions. The question of Canada's involvement in GATT is more closely examined later on in Chapters 6 and 9.

Livestock

Red-meat production also plays a major role in generating income in the Prairie region. As illustrated earlier, it is particularly significant in Alberta, where it accounts for over a third of agricultural cash receipts (Chart 2-4). The Prairie region exports red meat, not only to other parts of Canada but also outside the country, where the largest market for such products is the United States. Promotional efforts are also under way to expand beef and pork exports into the Japanese market.

The pattern of trade in livestock means that the issues facing producers of those products are very different from those facing producers of grains and oilseeds. The large shipments of beef and pork to the United States suggest that producers are much more concerned about accessibility to the U.S. market. Indeed, it has been estimated that pork and beef producers will benefit the most from the Canada-U.S. Free-Trade Agreement.[14] That is particularly true for Alberta, whose agricultural economy is much more livestock-oriented.

Nevertheless, livestock producers are concerned about the state of the world grain market. There is a significant interrelationship between trade in grains and trade in red meat and red-meat products. In the Prairie region both hogs and cattle use feed grains as an input. During the grain price boom of the early 1970s, for example, the livestock industry suffered large financial losses, and many producers sold off their cattle herds and hog enterprises. When the grain markets collapsed in the mid-1980s, the livestock industry once again strengthened.

This interrelationship has another facet to it. Prior to the 1970s, many farmers in the Prairie region had both livestock and grain as part of their farm enterprise. For various reasons, including government policies and very strong grain prices in the 1970s, many farmers became completely specialized in grain production (see Chapter 4 for a more complete discussion of this point). The problem with that strategy became apparent when the grain economy collapsed in the mid-1980s. Many farmers were left with "all their eggs in one basket" and found it difficult to adjust once the basket broke. The problem of specialization, whether it be at the farm or the provincial level, is much more acute in Saskatchewan than it is in the more diversified economies of Alberta and Manitoba.

Summary

Prairie agriculture is heavily dependent upon exports, particularly in terms of grains and oilseeds. The strong dependence on trade, however, brings with it a cost – risk and uncertainty. The international market, which is inherently unstable, has been made much more so over the years as the result of protectionist measures and the domestic agricultural policies in other major trading and producing countries.

The protectionist measures have also led to a major decline in the price of grains and oilseeds since the mid-1980s; that, in turn, has led to the crisis now facing Prairie agriculture. The main elements of this crisis are outlined in the next chapter.

3 The Crisis in Prairie Agriculture

Prairie agriculture, in the mid- through late 1980s, is going through a crisis that is perhaps worse than the Great Depression. It would be much worse were it not for the numerous programs that are in place to offset, at least in part, the collapse in world grain prices.[1] Although there is a crisis in Prairie agriculture, it does not imply that all farmers are in a crisis situation. As will be discussed later, less than 30 per cent of farmers could be classified as having severe financial problems. In addition, returns have been good for certain sectors of agriculture. Cow/calf operators and hog producers, for example, experienced excellent returns in 1987.

The purpose of this chapter is to outline the various dimensions of the crisis. In particular, it is important to identify both the income and the debt components of the crisis. This chapter discusses those two problems in some detail and relates them to the underlying volatility that is present in export-based agriculture.

Debt and Income

Despite the importance of livestock production in certain regions, the major agricultural activity in the Prairies is grain and oilseed production. As the previous chapter outlined, the low prices for the major commodities of the Prairie region during the 1980s can be traced directly to events on the international market. Of the Prairie provinces, Saskatchewan, with its greater specialization in grain production, has been the most severely affected by the drop in price. Alberta and Manitoba, where livestock and other agricultural commodities make up the larger percentage of the enterprise mix, have also suffered but to a lesser extent.

It is useful to examine what has happened to the economics of grain farming. The initial price for top-quality wheat – #1 hard red spring wheat (HRSW) – at the beginning of the 1987/88 crop year was $2.60 per bushel. The price can be placed in perspective by considering the cost of producing a bushel of that wheat. Data, for example, on the Saskatchewan brown-soil zone indicate that in 1986 the variable costs of producing wheat ranged between $1.60 and $2.40 per bushel, while total costs were approximately $5.00 per bushel (Table 3-1). When land costs are excluded, the total costs still exceed $4.00 per bushel. The costs of production in other areas of the Prairies can be expected to be similar.

Table 3-1

Acreage, Yield, and Variable and Fixed Costs of Wheat Production, by Cropping Method, Brown-Soil Zone, Saskatchewan, 1986

	Cropping method	
	Wheat on fallow	Wheat on stubble
Average size (acres)	511.75	430.37
Average yield (bushels/acre)	29.20	24.84
	(Dollars per acre)	
Materials	24.65	37.41
Power	7.95	7.33
Repairs	5.53	5.41
Operating capital	2.29	3.05
Total direct costs	40.42	53.20
Labour	6.13	5.99
Total variable costs	46.55	59.19
– per bushel	1.59	2.38
Management	17.82	11.70
Equipment and buildings	54.66	38.12
Land	25.36	23.31
Total fixed costs	97.84	73.13
Total variable and fixed costs	144.39	132.32
– per bushel	4.95	5.33

SOURCE R. A. Schoney, "1986 costs of producing crops and forward planning manual for Saskatchewan," Department of Agricultural Economics, University of Saskatchewan; and FARMLAB, FARMLAB Bulletin: FLB 86-01 (September 1986), Table 1*a*, p. 8.

While the initial wheat prices for the 1987/88 crop year were sufficient to cover the variable costs of production, they were insufficient to cover any major portion of the fixed costs. The result is that farmers face an income problem: they simply cannot earn enough money from sales to cover the costs of production. Simply stated, with wheat prices below $3.00 per bushel, farmers receive insufficient income on which to live, operate their farms, and maintain their investments in land, buildings, and equipment.

The income problem for many farmers has been at least partly alleviated by the agricultural policies adopted by the federal and provincial governments. For instance, the program initiated under the *Western Grain Stabilization Act* (WGSA) and introduced in 1976 has provided a substantial addition to farmers' incomes in recent years.[2] The federal government has also responded to the income problem by introducing a deficiency-payment scheme – the Special Canadian Grains Program (SCGP) – which became effective in 1987 (see Chapters 6 and 7 for a full discussion of western grain stabilization and the deficiency-payment scheme). As Table 3-2 shows, those two programs (WGSA and SCGP) accounted for roughly two-thirds of the net grain proceeds from the Canadian Wheat Board's marketing region in 1986/87.

As a result of those programs, the effective price that producers received was well above the world price. That enabled many producers in the Prairies to maintain a financially viable farm enterprise. The Economic Council of Canada estimates that 72 per cent of the farms in the Prairie region were in a financially stable position in 1987. That is down from the estimated 77 per cent who were in that category in 1985. The other side of this is that nearly 30 per cent of farmers were under some financial stress in 1987. In fact, 10 per cent of producers in the Prairies had operations that were nonviable.[3] As will be seen in the next chapter, many of those farmers had heavy debt loads.

For those farmers under financial stress, there are at least two implications: 1) the capital base of their farms will be continuously eroding, as there is insufficient income to replace depreciating assets; and 2) the farmers themselves and their families are either not living adequately or are doing so by drawing down savings and investments and/or pursuing off-farm employment.

Low income, as well as the financial stress that it creates, also brings with it a whole host of additional problems, including increased alcoholism and suicides. The lack of income in farming may force some farmers off the land and into towns and cities. Not only are such moves stressful, but farmers often find themselves without the skills needed to work in urban areas. In addition, the low price of the land that accompanies the low incomes means that should they sell their farms, farmers will take with them very little in terms of money. Low income also means that farmers may not be able to purchase the inputs needed to produce, to reinvest in their farming operations, or to diversify.

The level of income earned by farmers has repercussions elsewhere in the agricultural community. Boom or bust conditions in the farm sector implies boom or bust conditions in the agricultural input-supply business, the financial sector, the grain-handling and transportation sectors, and the rural communities and towns in which farmers live. Agriculture is much more than just producers. For example, the crisis of the 1980s has resulted in a decline in the number of machinery dealers; banks are suffering financial losses as a result of farm-loan payment difficulties, while businesses in cities and towns that are tied to agriculture are often forced to close. In short, there are multiplier effects associated with the level of farm income that have ramifications throughout the rest of the economy (Appendix A describes the theoretical development of the multiplier effects of both farm income and farm-asset value).

Table 3-2

Grain Income, Canadian Wheat Board Area, Crop Years 1979/80 to 1986/87

	Gross grain proceeds	Grain expenses	Net grain proceeds	Payment under:		Total net proceeds
				WGSA[1]	SCGP[2]	
			(Millions of dollars)			
1979/80	4,390	1,588	2,802	–	–	2,802
1980/81	6,383	1,765	4,618	–	–	4,618
1981/82	5,593	2,270	3,322	–	–	3,322
1982/83	6,120	2,487	3,633	–	–	3,633
1983/84	5,885	2,686	3,198	230	–	3,428
1984/85	5,411	2,880	2,531	522	–	3,052
1985/86	5,094	3,085	2,009	859	–	2,868
1986/87	3,988	2,940	1,049	1,384	800	3,233

1 *Western Grain Stabilization Act.*

2 Special Canadian Grains Program.

SOURCE *Western Agricultural Stabilization Act*, Annual Reports.

In addition to the price decline, the 1988 drought in the Prairies has created other problems. First, because of reduced grain and oilseed production, elevator companies will experience reduced revenue as a result of less throughput. That will mean layoffs for some employees and reduced earnings for the companies, which could result in less capital expenditures and reduced economic activity in the rural communities. Second, there will be a significant reduction in export movements of grain, which will likely mean layoffs at the terminals. In addition, the railways and shipping companies will find their revenues affected. Finally, although commodity prices began to rise in 1988, most farmers will be unable to take advantage of that because they have very little production to sell. In the absence of government assistance, there will be a reduction in the level of farm income.

To highlight the income problem that is facing Prairie farmers, an example is presented to illustrate the situation that faces a farmer who purchased land in 1980. The importance of the land purchase in the example is highlighted and serves as an introduction to the question of debt and its role in the crisis facing Prairie agriculture.

Example 1

Consider a farmer who in 1980 owned 640 acres of land outright and had more than sufficient equipment to farm that land. Land prices in the area at that time were $1,000 per acre. Assume that the farmer decided to purchase an additional 320 acres of land at the going rate; the total cost for the land was therefore $320,000. From savings, the farmer made a down payment of $70,000 and borrowed the remaining $250,000 over a 15-year term at 12 per cent interest. The annual principal and interest payments amounted to $36,700.

On a crop-rotation basis of two-thirds seeded and one-third summer fallow, the farmer seeded 640 acres. With an expected yield of 25 bushels per acre, production would have amounted to approximately 16,000 bushels. After deducting seed requirements, the farmer could expect to sell 15,000 bushels. In 1980, the price of wheat was $6.00 per bushel, resulting in gross sales of $90,000. With a living allowance of $30,000 and debt-service costs of $36,700, the farmer had $23,000 to cover operating expenses.

Now consider the situation in 1987, when that same farmer received the equivalent of $4.00 per bushel from a combination of market-price and government programs. Gross sales would then total $60,000 – an amount clearly insufficient to service the land debt, provide for living expenses, and cover operating costs.

Even in 1980, that farmer was in some financial trouble, since it would have been almost impossible to operate a 960-acre grain farm for $23,000 per year. As Table 3-1 indicated, the variable costs of producing wheat in 1986 were between $1.60 and $2.40 per bushel, depending upon whether the crop was seeded to summer fallow or stubble. With a two-third/one-third crop rotation, the farmer would have had an equal amount of wheat seeded to both summer fallow and stubble. Thus, in 1986 dollars, the average variable cost of production would have been approximately $2.00 per bushel. Deflating that cost to 1980 dollars would result in an average cost of production of roughly $1.60 per bushel.[4] With 640 acres seeded and an expected yield of 25 bushels per acre, the operating cost to the farmer would have been $25,600.

Why then did the farmer purchase the land? Although there were exceptions, most of the signals that the farmer was receiving – recommendations from government, outlooks from academics, forecasts by agribusiness – indicated that grain and land prices were going to continue to climb. Thus even if income from farming was somewhat low, it was not only likely to improve, but capital gains could be made from the increasing value of the land. In short, the farmers' expectations of the future became all-important. Unfortunately, those expectations were not met, as land values and grain prices plummeted. The fall in land values created further problems, as will be seen in the next example.

Example 2

Consider again that farmer who was operating a 960-acre grain farm. As the example above illustrated, falling grain prices made it impossible for him or her to service the debt, cover operating costs, and still have money left for living expenses. The falling grain price, however, was not the only reason for the low income. A major contributing factor was the debt the farmer incurred in 1980: the principal and interest payments of $36,700 amounted to over half of the $60,000 earned in gross sales. Since the cost of the debt was a major expense, it had a significant effect on the farmer's level of income.

The problem was not only the farmer's level of income, however. The land the farmer purchased and borrowed money against in 1980 is no longer worth $1,000 per acre. Instead, the price of that land fell dramatically – by 1987, it was likely worth about $500 per acre. The result is that even after making principal payments over the last seven or eight years and having contributed the down payment, the farmer's debt on the land may well exceed its sale value. The fall in asset values that accompanies falling grain prices creates a loss. That loss has to be borne by someone – either the farmer, should he or she choose to sell or retain the land, or the financial institution if the farmer defaults on the loan. With regard to the latter, the farmer likely used the entire farm as collateral for the loan to acquire the additional 320 acres; as a result, he or she may now be faced with the loss of the whole farm if the loan is defaulted.

It is important to bear in mind that this example reflects the position of those farmers who borrowed money and purchased land in the late 1970s and early 1980s. The farmers that did not expand their operations during that period are in a relatively better position than the example indicates. Although the value of their farms may have risen and subsequently fallen since the land was purchased in the 1960s or early 1970s, farmers who purchased land prior to the price boom do not generally have the debt loads described above. In addition, while the value of land may be considerably lower than in the early 1980s, it is generally higher than the debt owed by the farmer. This implies that if the farmer needed it, money could be generated from the sale of the land.

For the farmer who purchased land in the boom period, however, the falling value of land is important in several respects. First, as the value declines, the farmer's debt/equity ratio rises, making it more difficult to borrow operating capital. Second, the interest rate charged to the farmer may rise if the financial institution views him or her as a high-risk customer. Third, low land values make it difficult for the farmer to raise cash by selling off, for example, a quarter section of farmland.

What is known as "the debt problem" can thus be attributed to two factors. First, high land prices in the past meant that farmers who purchased farmland in the late 1970s and early 1980s were faced with large debt-service costs in the mid-1980s that not only reduced their incomes but in some cases threatened ownership of their farms. Second, the value of assets in agriculture can be expected to fluctuate markedly with the overall agricultural market; hence not only are farm incomes unstable but so, too, are asset values.

Rising and falling asset values also have different impacts, depending upon the type of enterprise in which the farmer is engaged. For instance, fluctuating land values have little impact on specialized hog producers, since the confinement method of production used by those producers requires only small amounts of land. Similarly, feed-lot operators are generally not land-intensive, unless the feed-lot owner purchases land on which to produce feed and silage.[5]

While cow/calf operations are much more dependent upon large tracts of land, ranchers involved in that enterprise are often able to lease their land from the provincial government. In addition, since much of the land used for cow/calf herds is not suitable for grain production, it is unlikely that its price would follow that of the better-quality land. This, however, should not imply that cow/calf operations are immune from fluctuations in asset values. The price of cows, which are the primary asset of cow/calf producers, varies considerably as the price of the output (calves) changes.

Thus fluctuating land values appear to have their greatest impact on specialized grain producers who have purchased their own land. As the next chapter will illustrate, agriculture in the Prairies is becoming much more specialized. This, combined with the increasing capitalization of agriculture, suggests that fluctuations in the value of assets like land will have a greater and greater impact on the agricultural industry.

The above discussion indicates an important facet of farming in the Prairies. Timing is extremely important when entering farming or expanding farm size. Buying land at the bottom of a land-price cycle has very different financial implications for a farm family than buying land when prices are at, or near, their peak. The example above showed that even a modest land acquisition by an established farmer, if undertaken at the wrong time, can lead to financial difficulty.

The numbers also reveal that it is extremely difficult, even with land prices at $500 per acre, to make payments on purchased land. This substantiates the often-heard saying that "the only way persons can begin farming is if they have land given to them." In other words, because of the high capital requirements, entry into agriculture is very difficult for anyone who has to purchase land outright. This suggests that new entrants into agriculture will generally be those whose parents and/or relatives are engaged in agriculture and are willing to transfer assets at below-market value. This, in turn, implies that farm size will continue to grow, because only those with established operations will be able to expand.

Summary

The major components of the crisis facing Prairie agriculture are low income and high debt. Although related, the income problem and the debt problem are nevertheless distinct – an important factor to remember when examining the role that agricultural policy plays in Prairie agriculture. Some of the factors that have led to the income and debt problems are outlined in the next two chapters. These factors are also important in understanding Canadian agricultural policy and its implications.

4 Characteristics of Prairie Agriculture

This chapter examines some additional dimensions of Prairie agriculture that are important in assessing future policy directions and that have contributed to the income and debt problems facing Prairie agriculture. As will be seen in later chapters, certain of these features are extremely difficult to deal with, particularly the overcapitalization of farm assets and the decline in rural communities.

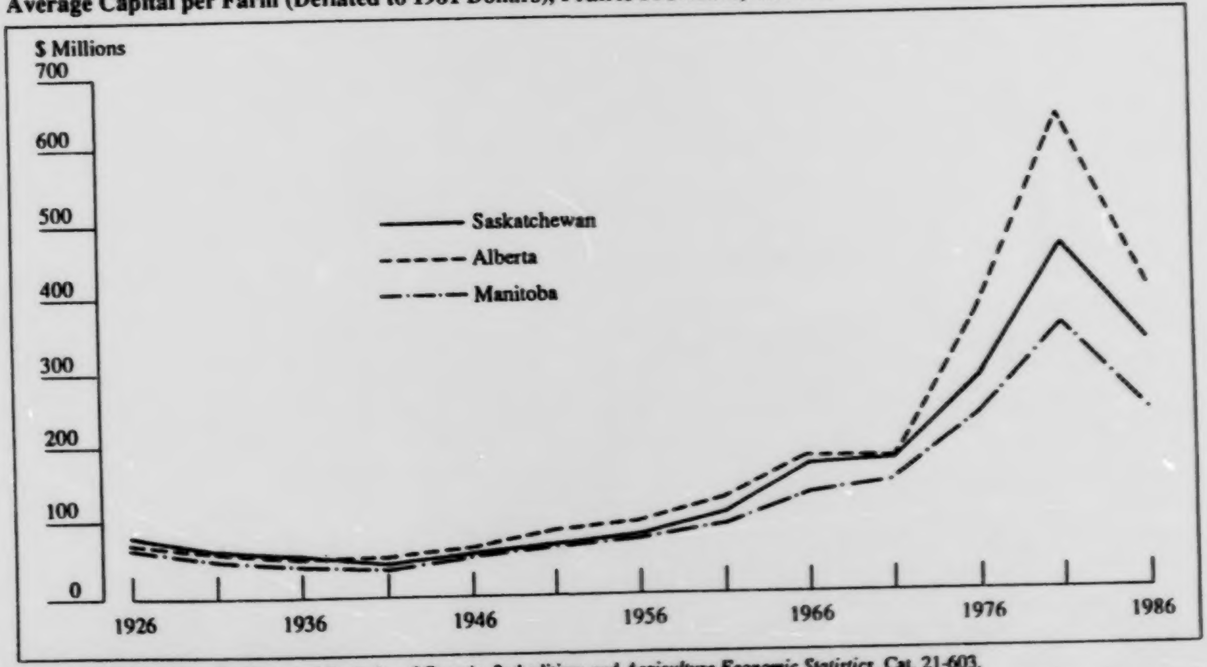
Capital Intensity

The capital intensity of Prairie agriculture has increased significantly over the years; for example, the average capital value of an Alberta farm, expressed in constant 1981 dollars, was $74,534 in 1926 and $401,407 in 1986. Chart 4-1 shows the average real capital value per farm for the three Prairie provinces from 1926 to 1986. Between 65 and 75 per cent of the capital assets are held in the form of land and buildings; the remainder is in the form of machinery, equipment, and livestock. Notice that the highest growth in capital values has occurred since 1971. In fact, the capital per farm tripled in value in the 10 years between 1971 and 1981. The decline in asset values that occurred over the period 1981-86 still left the average capital per farm at approximately twice the 1971 level.

As the agricultural industry has become much more capital-intensive, there has been a dramatic increase in purchased inputs, particularly fertilizers and pesticides. Fertilizer expenditures for the Prairie region increased approximately 20-fold between 1970 and 1986; in Saskatchewan, the increase was 46-fold. Fertilizer purchases as a percentage of total farm expenditures also increased in the Prairie region – from 3.1 per cent in 1970 to 10.2 per cent in 1986 (Chart 4-2).

Chart 4-1

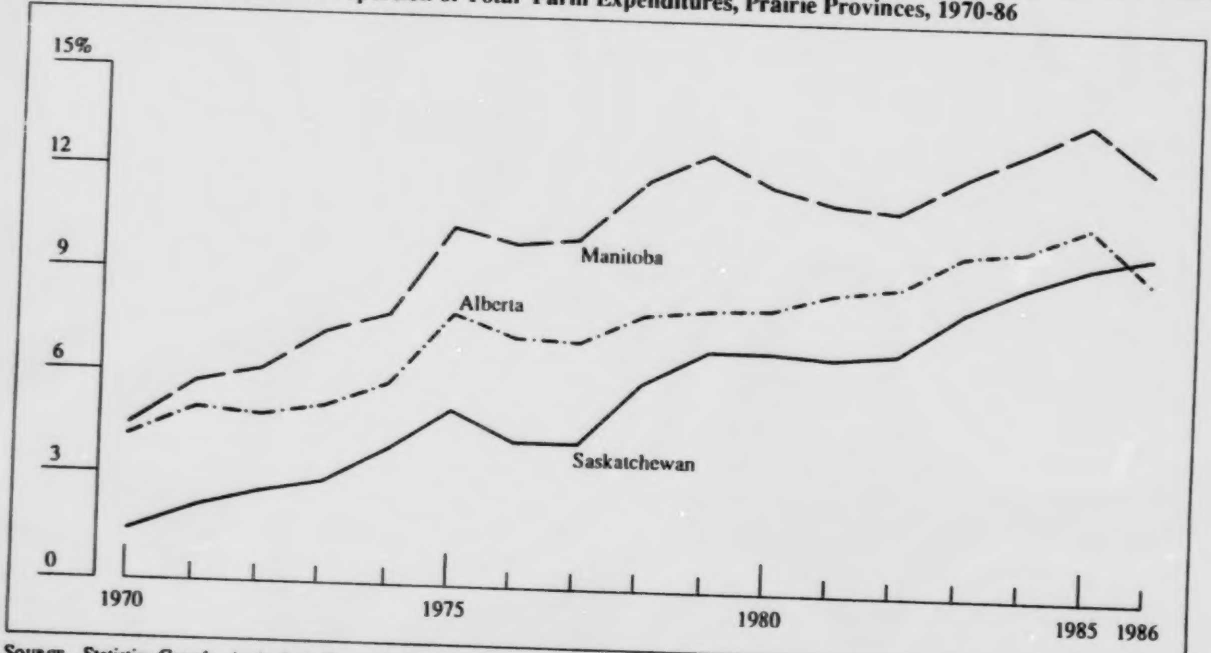
Average Capital per Farm (Deflated to 1981 Dollars), Prairie Provinces, 1926-86



SOURCE Statistics Canada, *Historical Statistics of Canada*, 2nd edition; and *Agriculture Economic Statistics*, Cat. 21-603.

Chart 4-2

Fertilizer Expenditures as a Proportion of Total Farm Expenditures, Prairie Provinces, 1970-86



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

The value of pesticide expenditures for the Prairie region increased about 33-fold between 1970 and 1986. As a proportion of total expenditures for the Prairie region, pesticide expenditures rose from 1.1 per cent in 1970 to 6 per cent in 1986 (Chart 4-3).

The increased capital intensity of the industry and the rising use of purchased inputs has meant that the use of borrowed capital is now more prevalent than in earlier decades. As a consequence, the level of debt and interest expenditures has increased. Chart 4-4 shows the level of farm debt for the three Prairie provinces. The highest level of debt is in Alberta, followed by Saskatchewan and Manitoba. In 1984, total farm debt for the three Prairie provinces exceeded $10 billion. The distribution of that debt, by major lender, is presented in Chapter 9.

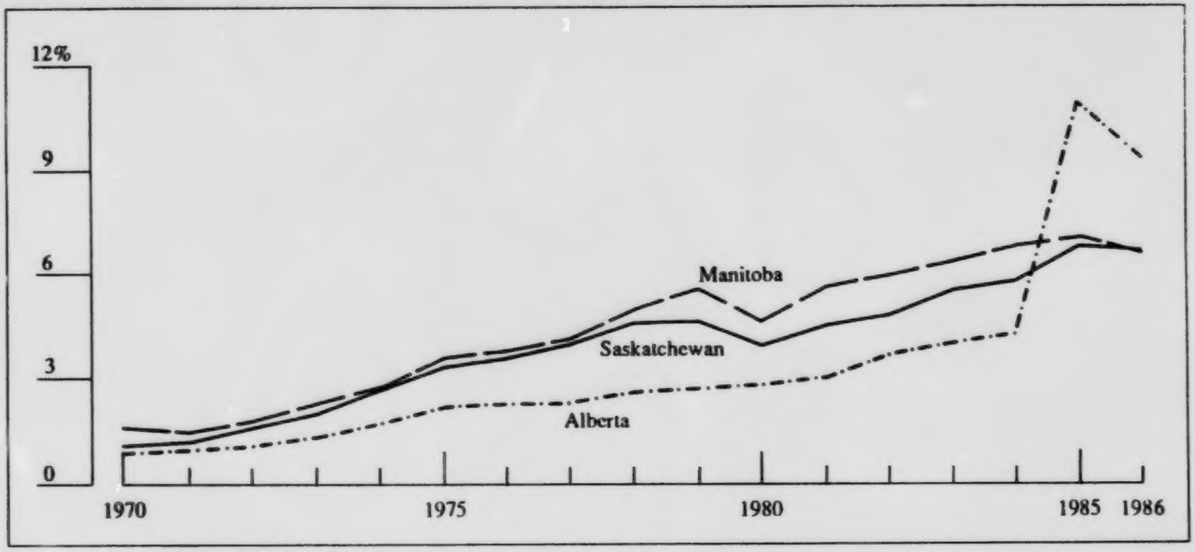
Prairie producers have traditionally used a combination of debt and equity to purchase the capital assets required to farm. In the 1970s, farm income, debt, and the value of farm assets (including land) all increased together. Debt as a proportion of total capital value fell significantly. In the 1980s, however, the reverse happened. As the example in the previous chapter illustrated, land values can fall while debt remains constant. In fact, the need to purchase inputs, combined with continued land purchases, meant that debt continued to grow while both income and the value of assets fell. Chart 4-5 illustrates the ratio of realized net farm income to farm debt for the Prairie region over the period 1971-86. In 1986, it would take nearly seven years for the total debt to be paid off.

As a number of studies have indicated, the debt held by Prairie farmers is not uniformly distributed. According to the Saskatchewan Wheat Pool (SWP) Task Force Report, 26 per cent of the SWP members who responded to the survey had no debt at all in 1986, with a further 42 per cent having equity of at least 75 per cent in their farming operations. The flip side of this picture is that those farmers with equity of less than 50 per cent in their operations (14 per cent of the farmers) had 45 per cent of the debt.[1] Data presented in the House of Commons Report of the Standing Committee on Agriculture show the same thing.[2]

The Economic Council of Canada estimates that interest payments in 1987 accounted for 14 per cent of farm cash expenses on farms that were considered nonviable. For farms that were considered financially stable, interest payments were 8 per cent of farm cash expenses. Debt also seems to be concentrated more among younger farmers. For those farmers under 35 years of age with nonviable operations, interest payments accounted for anywhere from 15 to

Chart 4-3

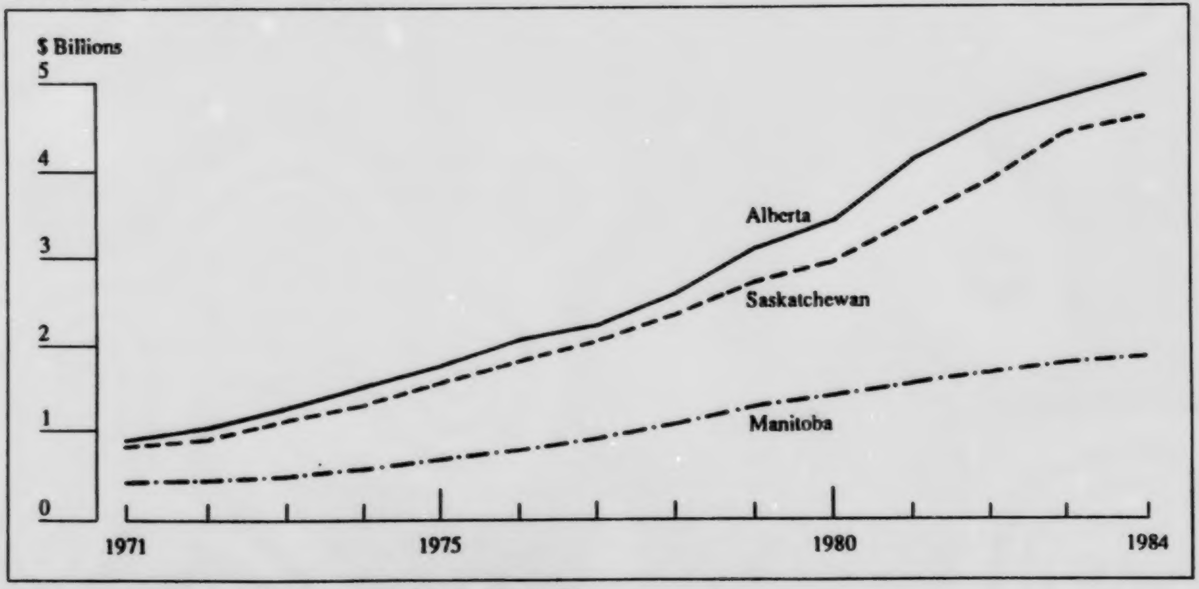
Pesticide Expenditures as a Proportion of Total Farm Expenditures, Prairie Provinces, 1970-86



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

Chart 4-4

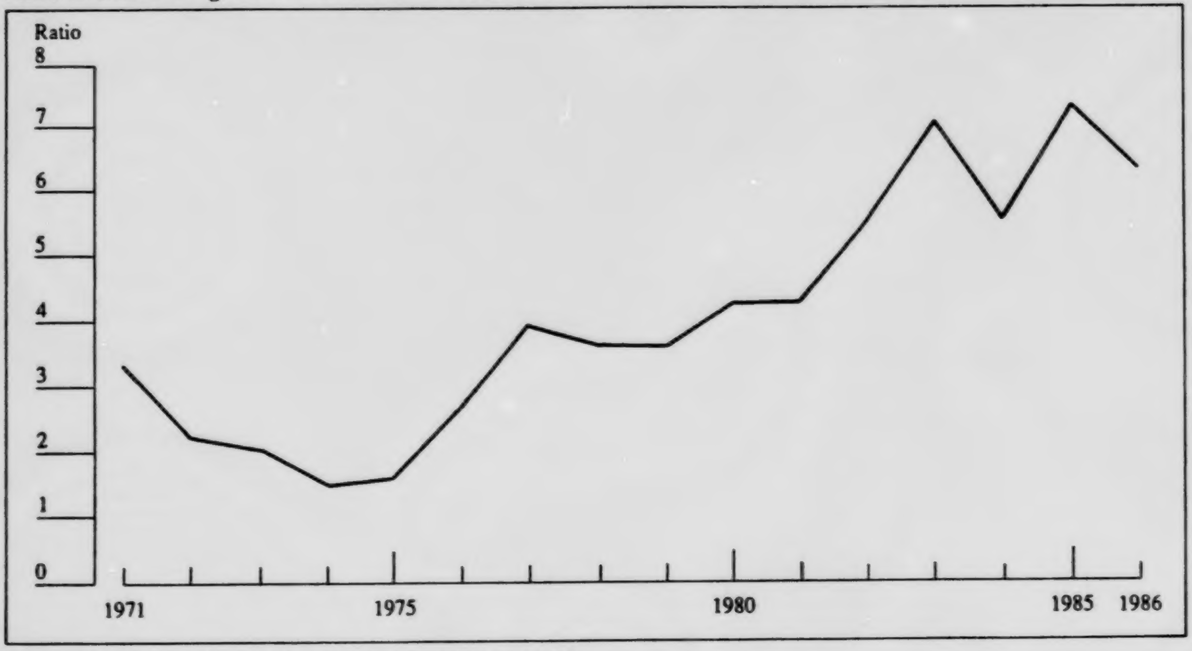
Level of Debt, Prairie Provinces, 1971-84



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

Chart 4-5

Ratio of Outstanding Farm Debt to Realized Net Farm Income, Prairie Provinces, 1971-86



SOURCE Statistics Canada, *Agriculture Economic Statistics*, Cat. 21-603.

21 per cent of cash expenses, depending upon whether the farm was one that was operated by a full-time farmer or a small marginal farm.[3]

From these data and the discussion presented in the previous chapter, it is clear that for those farmers with debt, grain and oilseed prices are too low to generate sufficient income to service debt. This indicates, once more, the importance of the debt component of the agricultural crisis.

Increasing Specialization

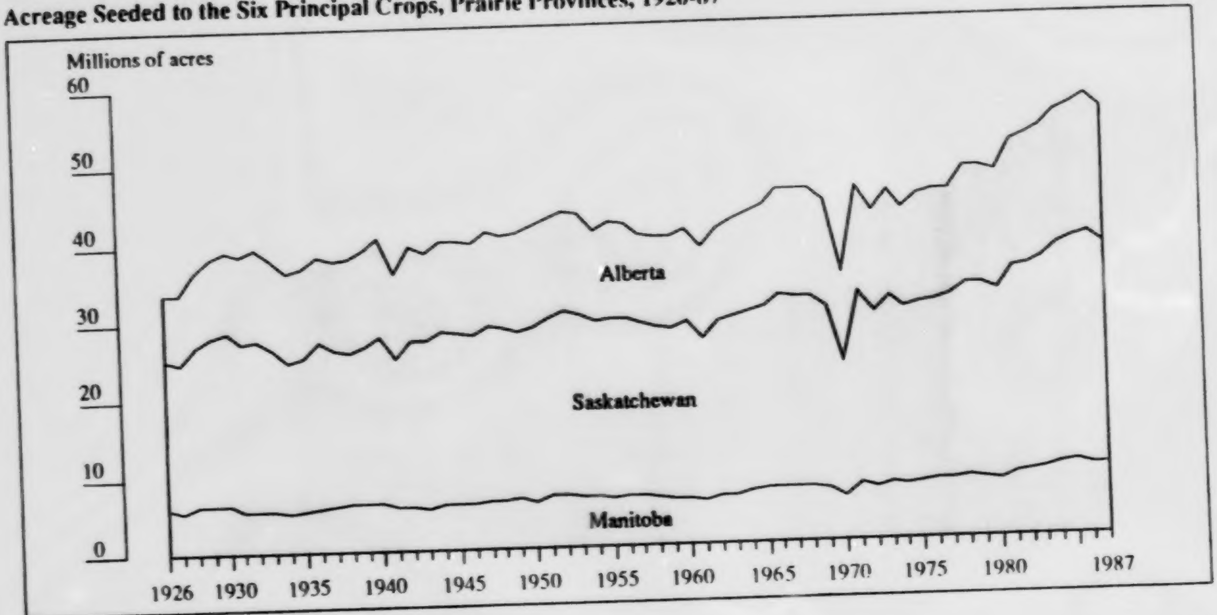
In addition to becoming increasingly capital-intensive, Prairie agriculture has also become increasingly specialized in terms of the relative importance of grains and oilseeds versus livestock in the production mix. Chart 4-6 provides data on the acreage seeded to the six principal crops for Manitoba, Saskatchewan, and Alberta. There has been a sizeable increase in seeded acreage, especially for Saskatchewan. Since the 1970s, Saskatchewan's acreage has increased in the neighbourhood of between 8 and 10 million acres. That is due to many factors, including the breaking of pasture land for grain and increased continuous cropping. The latter factor is also responsible for the increase in pesticide and fertilizer usage discussed above.

The increases in seeded acreage are reflected in increases in production. Chart 4-7 shows the production of wheat for the years 1926 to 1987. Over that period, Prairie wheat production increased by roughly 50 per cent. That is more than for export competitors such as Australia and Argentina.[4] Most of the increase in production has occurred since 1970. In addition, while the overall trend has been upward, production is nevertheless extremely volatile, primarily because of the fluctuations in weather patterns.

Cattle numbers have followed a much different pattern than wheat production. From the early 1940s until the early 1970s, the general trend in cattle numbers was upward (Chart 4-8). Since 1975, however, that trend has been reversed, with the result that cattle numbers in 1987 were at approximately the same level as in the late 1960s. The shift out of cattle production can be primarily attributed to the rise in grain prices that occurred in the mid-1970s, which made cow/calf and feed-lot operations less profitable than grain. In addition, with their optimistic expectations regarding future grain prices, producers saw no need to maintain both

Chart 4-6

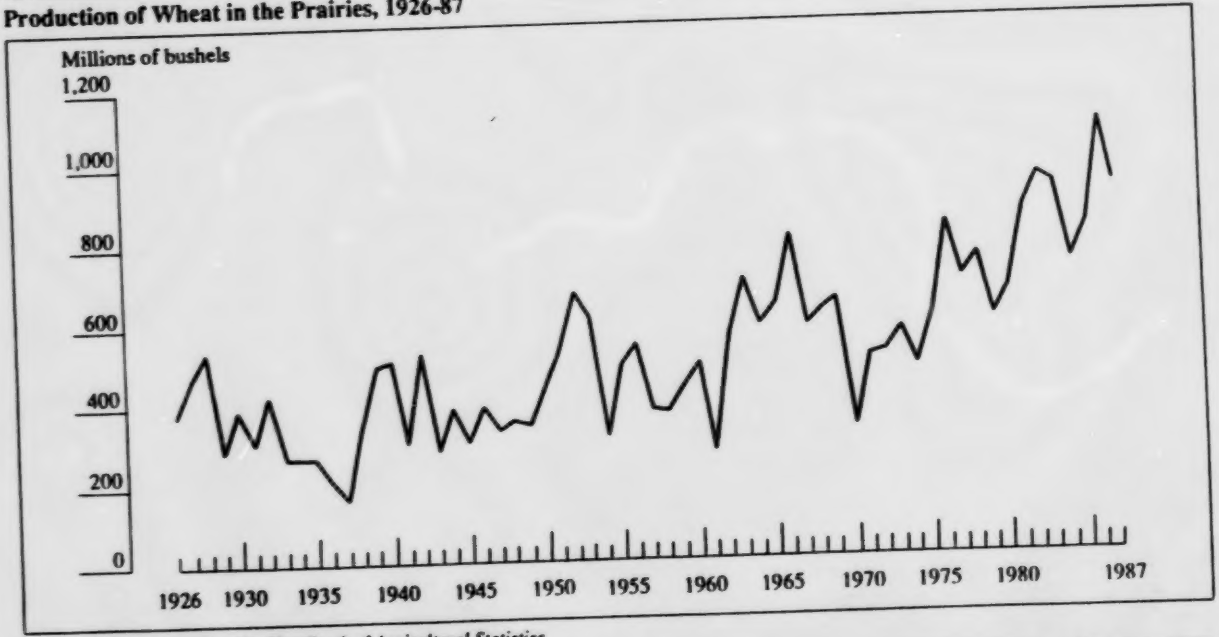
Acreage Seeded to the Six Principal Crops, Prairie Provinces, 1926-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 4-7

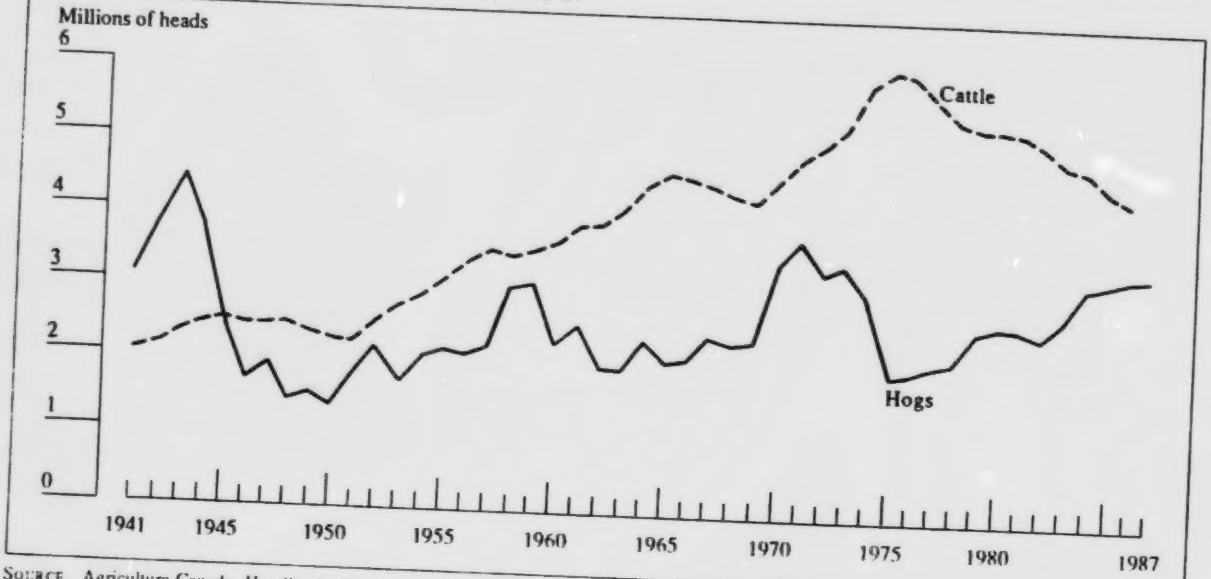
Production of Wheat in the Prairies, 1926-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 4-8

Number of Hogs and Cattle on Prairie Farms, 1941-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

wheat and cattle in the production mix.[5] Hog numbers, while much more volatile than those of cattle, have exhibited no overall trend for the period since 1941. While the number of hogs on farms fell in the early 1970s, there has been a steady increase in hog numbers since 1975.

The factors that led to an increasing level of grain production and a declining level of cattle production during the 1970s and 1980s also gave rise to an increased level of farm specialization. Table 4-1 presents data on the number of cattle and hogs on farms in census years 1971, 1976, 1981, and 1986, as well as the number of farms raising that livestock. The most striking feature of the data is the dramatic decline in the number of farms reporting livestock production. In short, farmers who once operated a mixed farm were switching increasingly to the production of either grains or livestock, but not both. In addition, given the high price for grain and the expectation that the trend would continue, farmers were increasingly turning away from livestock production.

The shift of producers into more specialized grain production has generated additional dimensions to the problems facing Prairie agriculture. The development of larger equipment specifically designed for grain production has facilitated the growth of farm size. That has resulted in fewer farmers, which in turn has caused a decline in rural communities. With many farmers specializing in grain production, the demand for off-farm employment (especially in winter) has grown. That is especially true as farmers look for other ways to generate income in the face of low grain prices and drought conditions. The major trends in farm size and off-farm income are examined in the next section.

Rural Infrastructure

Farm Structural Characteristics

One of the most important trends in agriculture over the past 60 years, both in the Prairies and elsewhere in Canada, has been the decline in farm numbers (Chart 4-9) and the corresponding increase in the average size of farms (Chart 4-10). This major structural shift is closely tied to another trend in agriculture – the declining real price of grain, which was discussed in Chapter 2. Simply put, the decline means that farmers have to become more efficient (i.e, there must be more output with fewer inputs) if they wish to survive. One of the easiest ways to do that is to expand production by increasing the number of acres farmed. As mentioned above, the development of machinery that makes large-scale farming possible has aided that process.

Table 4-1

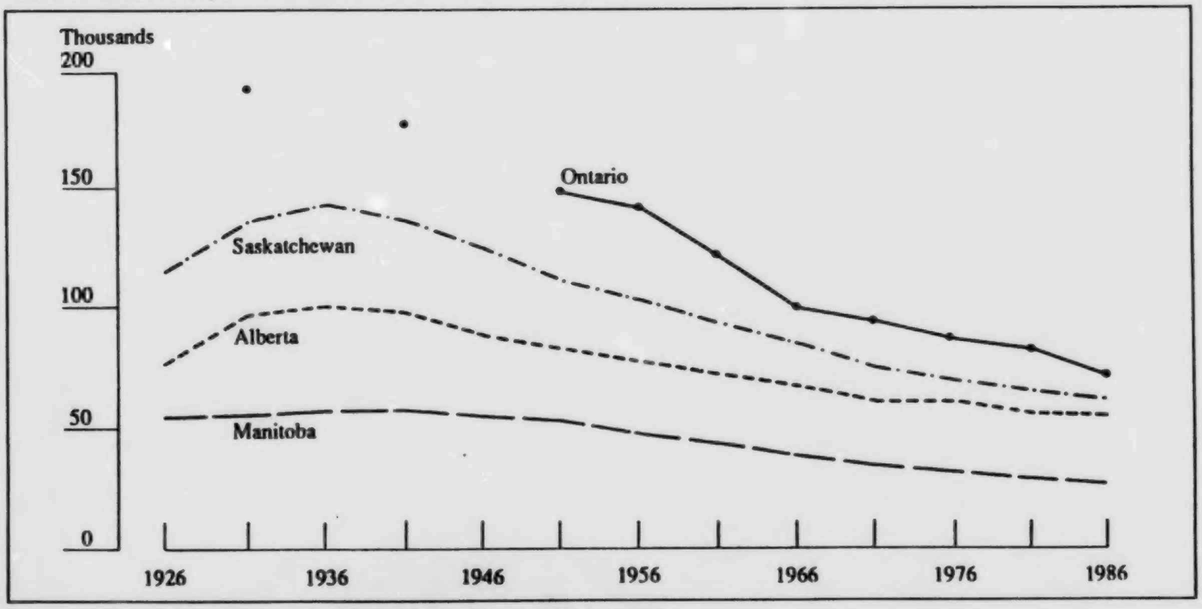
Number of Cattle and Hogs on Farms Reporting, Prairie Provinces, Selected Years, 1971-86

	1971	1976	1981	1986
		(Thousands)		
Manitoba				
Number of cattle	1,138	1,400	1,176	1,115
Number of farms reporting	22.4	20.5	16.0	13.9
Number of hogs	1,071	626	875	1,072
Number of farms reporting	14.2	6.1	5.1	3.5
Saskatchewan				
Number of cattle	2,645	3,132	2,418	2,051
Number of farms reporting	45.6	42.3	32.8	26.4
Number of hogs	1,145	491	574	599
Number of farms reporting	26.1	12.2	9.2	5.8
Alberta				
Number of cattle	3,702	4,614	4,193	3,827
Number of farms reporting	44.6	44.6	37.1	33.5
Number of hogs	1,816	878	1,199	1,455
Number of farms reporting	26.2	12.5	9.9	6.5

SOURCE Statistics Canada, *1986 Census of Canada: Agriculture*, Cat. 96-109, 96-110, and 96-111.

Chart 4-9

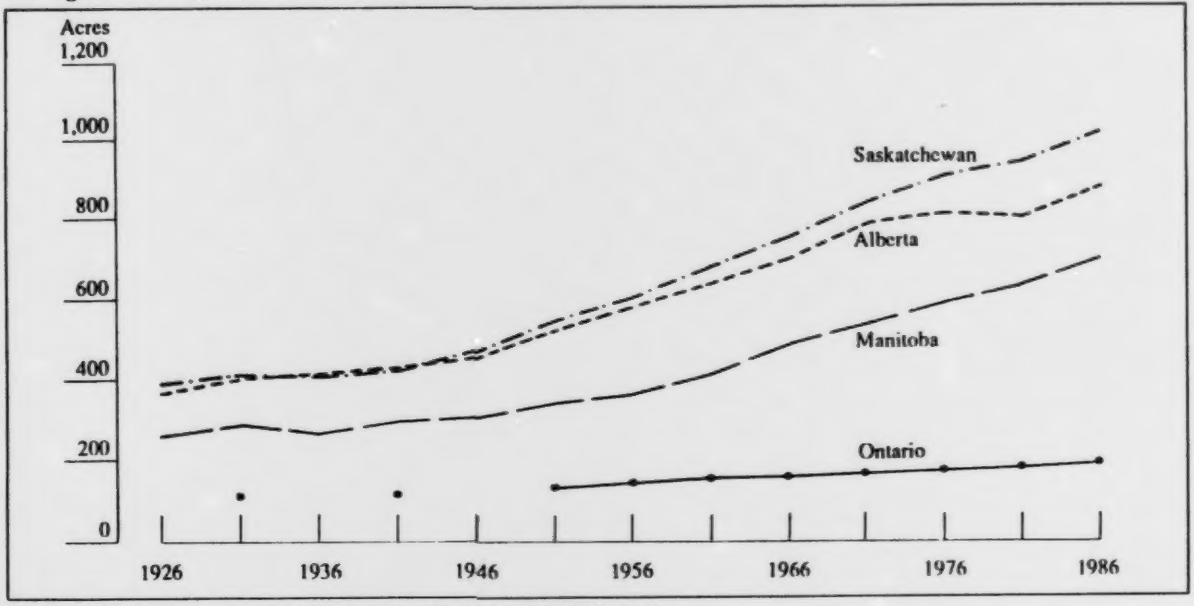
Number of Farmers, Ontario and Prairie Provinces, 1926-86



NOTE No farm numbers were found for the years 1926, 1936, and 1946 for Ontario.
SOURCE Statistics Canada, *Census of Canada*, 1976-86; and *Historical Statistics of Canada*, 2nd edition.

Chart 4-10

Average Farm Size, Ontario and Prairie Provinces, 1926-86



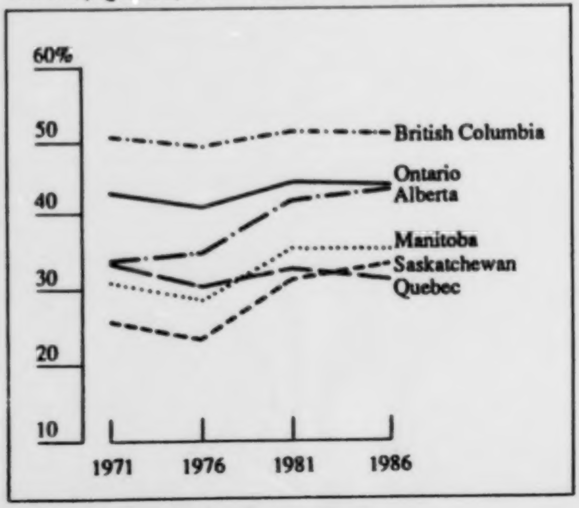
NOTE No farm numbers were found for the years 1926, 1936, and 1946 for Ontario.
SOURCE Based on data from Statistics Canada.

The declining real price of grain and the increased specialization appear to have had another effect on the structure of Prairie agriculture. Chart 4-11 shows the percentage of farmers in Quebec, Ontario, the three Prairie provinces, and British Columbia who report off-farm income. Between 1971 and 1986, all three Prairie provinces showed increases in the percentage of farmers who earn off-farm income, with the increase having been greatest since 1976. This suggests that farmers in that region are finding it increasingly difficult to earn an income from farming.

Chart 4-11 also shows that, with the exception of Quebec, the percentage of farmers with off-farm employment has generally been lower in the Prairie provinces than elsewhere in Canada. This pattern suggests that those provinces generally have fewer opportunities for such employment, mainly because of their smaller industrial base. Notice that in 1986 the percentage of farmers in Alberta with off-farm income had reached a level roughly equal to that in Ontario. That also reflects the greater diversity of the Alberta economy, compared with that of Manitoba and Saskatchewan.

Chart 4-11

Proportion of Farmers Reporting Off-Farm Income, Ontario, Quebec, and Western Provinces, 1971-86



SOURCE Based on data from Statistics Canada.

The declining farm numbers and the ever-increasing need for off-farm employment also appear to have had an effect on another important structural characteristic – land tenure. Farmers in the three Prairie provinces own approximately 60 per cent of the land they farm and have some type of rental agreement for the other 40 per cent. The degree of ownership in the Prairie provinces is significantly less than in Ontario and Quebec, where the percentages are 75 and 87 per cent, respectively.

Community Structure

The decline in farm numbers has precipitated a similar decline in the number of viable rural communities. The Prairie agricultural economy was initially developed to service small mixed farms that were producing wheat for an export market. Railways were the dominant transport mode, and towns sprang up every 7 to 10 miles along the railway. As farms grew larger, as highways improved, and as the capacity of grain trucks increased, the smaller communities came under severe stress, with many of them having disappeared. As an example of the changes that have occurred, the number of Prairie elevators decreased from 5,728 in 1935 to 1,846 in 1986.[6]

An example will serve to illustrate the decline in the number of rural towns and villages in the Prairies (recognizing that only one example makes generalization difficult). The area chosen includes the town of Central Butte, Saskatchewan.[7] In 1950, there were 12 towns and villages – Chaplin, Riverhurst, Central Butte, Bridgeford, Grainland, Lawson, Aquadell, Mawer, Kettlehut, Halvorgate, Gilroy, and Secretan – all within a 35-square-mile region. In 1987, only Chaplin, Riverhurst, and Central Butte remained; the others had been abandoned. In the course of roughly 35 years, three-quarters of the towns and villages have disappeared.

The three towns and villages that are left no longer have a major machine dealership. All three had International Harvester at one time; and Central Butte, for example, also had John Deere and Massey-Ferguson. Moreover, the removal of the grain elevators in both Riverhurst and Central Butte is a distinct possibility in the near future.

The distance to bus school children is increasing as enrolment declines and the school system becomes more centralized. Rural hospitals are also closing as the health care system moves to larger centres. Recreational facilities, such as skating and curling rinks, are disappearing. The major country and grid-road system is expensive to maintain as the rural population declines. Increasingly, rural residents are complaining about property taxes and asking the provincial government to provide greater transfer payments to support local governments. Perhaps the relevant question is: how many viable farms can a wheat economy support, and how many communities are required to serve the operators of such farms?

Summary

This chapter examined a number of trends that have been occurring in Prairie agriculture. During the 1970s and the 1980s, agriculture in the Prairie provinces became increasingly capital-intensive, highly dependent upon purchased inputs such as fertilizers and pesticides, and much more specialized in the production of crops and livestock. The high capital intensity and the importance of purchased inputs have caused the level of debt in the industry to rise substantially. As Chapter 3 illustrated, this is a major factor underlying the debt and income problems.

The trend towards specialization in crop production is another factor that has contributed to the debt and income problems facing Prairie agriculture. The availability of larger and larger equipment designed specifically for grain production has facilitated the growth in the size of farms; that, in turn, has increased the demand for land and may have contributed to its increase in price. Also, specialization in crops has meant that when a downturn occurred in the grain market, farmers did not have income from livestock to fall back on. While a number of the larger communities prospered during the 1970s and 1980s, the smaller communities generally became weaker, particularly during the crisis of the mid-1980s.

The next chapter examines, from a theoretical perspective, some of the reasons why those trends have occurred. It also presents a framework to explain the manner in which the boom-and-bust nature of Prairie agriculture has contributed to the debt and income problems facing the industry.

5 Falling Prices, Volatility, and Farm-Asset Values

The previous chapters pointed out two fundamental characteristics of Prairie agriculture: the first is the declining real price of wheat (Chart 1-1); the second is the tremendous volatility experienced in price, production, and income (Charts 1-1, 1-3, and 4-7). The purpose of this chapter is to outline, from a theoretical perspective, some of the economic forces that have given rise to those features and to examine their implications for the value of farm assets.

The Declining Real Price of Wheat

The observation that the real price of wheat and other agricultural products tends to fall over time has been well documented. T. W. Schultz, a Nobel laureate, identified the trend as being the result of three interrelated factors: 1) the supply of agricultural products tends to increase rapidly because of technological progress and the competitive nature of the industry; 2) the demand for agricultural goods is highly inelastic; and 3) the income elasticity for food in the industrialized nations is low.[1]

One of the major reasons for the rapid technological progress is government-financed research, which has resulted in dramatic increases in crop yields.[2] These yield increases have occurred in both developed and developing countries, with the result that the supply of grains and oilseeds has been expanding at a rapid rate.[3] Government policies that have supported agriculture have also played an extremely important role in expanding production.

The inelastic nature of food demand implies that consumers are not very sensitive to the price of food when it comes to the quantity they wish to purchase. In other words, an increase in price will not reduce demand by very much; nor will a fall in price increase demand to any great extent. If the supply of food is expanding rapidly because of technological change, the inelastic nature of demand implies that price will have to fall by a considerable amount in order to induce consumers to purchase the increased production – unless, of course, demand can be increased in other ways.

One thing that does cause demand to increase over time is higher income; however, the low income elasticity of food implies that the growth in food demand will not be as large as the growth in income. In other words, the demand for food does expand with a growth in income but at a slower rate. This results from consumers spending their extra income on goods and services other than food, largely because they have already satisfied their food needs.

The combination of factors (1) and (3) means that the supply of food outpaces demand as a country grows and expands. When this oversupply is combined with (2), the result is a continually declining price of food. Willard Cochrane presents this argument succinctly when he discusses the "agricultural treadmill":

> Rapid and widespread farm technological advance drives the aggregate supply relation ahead of the expanding aggregate demand relation in peacetime; and, given the highly inelastic demand for food, farm prices fall to low levels and stay there for long periods.[4]

Farmers' incomes can be expected to decline with the decline in price, unless they are able to adopt the technology (and thus increase their yields) fast enough to enable them to stay ahead of the game. Since all farmers cannot do that, the result is a chronic income problem for a major portion of agriculture. As was seen in the last chapter, the income problem has also been one of the major factors behind the tremendous structural change that has occurred in agriculture. As a result, the question of falling real prices of agricultural commodities has been one of the focuses of agricultural policy (see Chapter 6).

Volatility in Agriculture

The inelastic nature of food demand described above is also a cause of the tremendous volatility that has been discussed in earlier chapters. The inelastic demand means that any changes that occur in production will have a substantial effect on price. Thus if production is highly volatile, price will react in a similar manner. As Chapter 4 illustrated, production in the Prairies is highly variable, largely because of the changing weather patterns. While production from the Prairies is not sufficient to influence the world market price, weather fluctuations elsewhere in the world can easily affect world production to the point where the world price is affected. A good example of this is the drought of 1988, which affected both Canada and the United States. Primarily because of the reduced supply from the United States, the prices of wheat, corn, and soybeans moved sharply higher.

Weather is not the only factor that can influence production; as Chapter 2 pointed out, the domestic policies of the major trading countries have also had an effect on the world supply of grains and oilseeds. The sensitivity of the world price to government policy is perhaps best illustrated by the U.S. 1985 farm bill, where a change in the loan rate led to a fall of approximately US$1.00 per bushel in the world price of wheat. That was equivalent to a decline of C$1.30 per bushel.

The volatile nature of agriculture prices is also the result of an inelastic supply. At any given time, the supply of agricultural products in the world can be considered to be virtually fixed. If demand should suddenly increase, the only way to ration it in the short run is to raise the price. Similarly, if demand should suddenly fall, the only way to get rid of the extra product is to lower the price substantially. While these shortfalls and surpluses can be dealt with by increased or decreased production in the longer run, the only immediate solution is a price reaction. The result is that changes in demand caused by such factors as a downturn in world economic conditions or an abrupt change in the exchange rate can be expected to have rather large effects on the price of agricultural products.

The volatility in grain prices that occurred as the result of these forces has given rise to the fluctuations in farm income in the Prairies that were examined in Chapter 1. As noted in Chapter 3, the fluctuations in income gave rise to changes in asset values, which are the root of the debt problem facing Prairie agriculture. The next section discusses in more detail the relationship between farm income and farm-asset values.

Farm-Asset Values

Prairie agriculture is very capital-intensive, employing many different types of assets, some of the most important of which are land; machinery and equipment; buildings; and, for the livestock producer, the breeding herd (see the discussion in Chapter 4 regarding the level of assets in the Prairies and the various components of those assets). As was seen in previous chapters, the price that farmers pay for those assets is one of the major determinants of the financial health of the farm. Interestingly (and what is very important in terms of agricultural policy), the financial health of the farm is also one of the major determinants of the value of those assets.

From a theoretical perspective, the value of an asset should be closely related to the level of income that the asset can generate. For instance, if a given asset – say, land – is expected to generate a return of R per year, then the amount that farmers should be willing to pay for that asset (V) is given by the simple capitalization formula

$$V = \frac{R}{r},$$

where r is the rate of interest expected over the life of the asset.

A simple example will illustrate. Suppose that R = $100 and the interest rate is 10 per cent. Using the formula above, the farmer should be willing to pay $1,000 for that asset. Notice that by purchasing the asset at that price and receiving $100 per year, the farmer will be receiving exactly the same rate of return as if he or she had put the $1,000 in the bank at an interest rate of 10 per cent.

In determining what the value of the asset should be, the farmer is aware that expectations play an important role. For instance, in the above example it was assumed that the farmer expected the asset to return $100 per year. Suppose, however, that the farmer had expected that the returns would decrease over time. Obviously, the farmer would not have been willing to pay $1,000 for the asset. On the other hand, if the farmer had expected the returns to increase over time, he or she would have been willing to pay more than $1,000 for the asset.

The simple capitalization formula can be modified to reflect those different expectations. For example, if the returns from the asset were expected to rise at rate g, then the value that a farmer would be willing to pay is given by the capitalization formula

$$V = \frac{R}{r - g},$$

where g is the expected percentage increase per year in the returns from the asset. Note that g can take on either positive or negative values.[5]

If g were positive, the returns from the asset could be expected to increase at a rate of g per cent per year. With g equal to +5 per cent, the farmer would be willing to pay up to $2,000 for the asset. If g were negative, on the other hand, the returns would be expected to decrease over time. As an example, the value of the asset would fall to $500 if the farmer believed that g was equal to –5 per cent.

It is useful to examine in more detail the implications of the capitalization formula. It is obvious from the formula that fluctuations in the returns to farming could be expected to lead to changes in asset values. For example, with all else being the same, increasing the returns to the asset from $100 to $200 would lead to a rise in the price of the asset from $1,000 to $2,000.

All other factors may not remain the same, however. For instance, should the rise in the returns to the asset be the result of a reduction in interest rates (which lowered the borrowing costs on inputs like fertilizer and chemicals), the result could be an even larger increase in the asset price, since the denominator in the capitalization formula would now be smaller. That could cause the price paid for the asset to rise above $2,000. That price rise could also be obtained in a different manner. If farmers expect that the rise in returns is an indication of future increases (i.e., if they believe that *g* is greater than zero), they will again be prepared to pay in excess of $2,000 for the asset.

Of course, changes in asset values could occur without any change in the immediate returns. A rise or fall in interest rates would likely affect asset values even if the returns to that asset remained constant. Similarly, a change in expectations by farmers regarding the rate of growth of returns could affect asset values without any change in the current level of income.

Fluctuating asset values, particularly if they are caused by changing expectations, can have severe effects on agriculture (see Appendix B for a full discussion of market dynamics, expectations and asset values). Suppose, as in the example above, that farmers believed that the $100 return today was going to rise at a rate of 5 per cent and that on that basis the value of the asset rose to $2,000. Suppose, however, that after a few years, farmers realized that returns were not going to rise at a rate of 5 per cent; instead, their expectation was that returns would be stable. As a result, the price of assets would fall back to $1,000.

The farmers in that situation are faced with a problem. As shown in the example in Chapter 2, if they borrowed money to pay for the asset, the result would be that after making interest payments, a loss would be sustained on their farming operations. Furthermore, the farmers could not get out of the problem simply by selling the asset. Since asset values would have fallen with the fall in returns, selling the asset would still leave farmers in a shortfall position. In fact, the only way they could escape financial hardship would be to have purchased the asset with cash. In such a situation, although the farmers could still earn a profit, the rate of return on the cash investment would be very poor (if the asset had been purchased at a price of $2,000, then with earnings of $100, the rate of return would be 5 per cent).

The situation described above is, of course, very similar to what happened to Prairie agriculture. Fluctuating returns from farming and changing expectations led to substantial changes in asset values. When the high expectations of the 1970s were not realized in the 1980s, the result was financial stress for that segment of the farm population who had entered farming or expanded their operations when asset values were high. In short, the difficulty with long-run decisions like purchasing land is that expectations are likely to change before the asset has been paid for fully.

The point to be made is that the forces determining asset values are numerous and very complex. That is particularly true of expectations. As was shown above, changes in expectations alone can have a tremendous impact on the financial health of the agricultural sector. In terms of agricultural policy, it suggests (as will be seen in later chapters) that policy makers must be aware of more than just the impact that policy is having on agricultural returns if they want to stabilize the value of assets over time.

Land-price fluctuations, their causes, and their effects cannot be overemphasized when discussing agricultural policy. Consider, for example, the views expressed by Phillip Raup, an agricultural economist at the University of Minnesota, on the implications of land values for U.S. agriculture. His statement applies equally well to Prairie agriculture:

> One consequence of the sudden expansion of foreign agricultural markets was that economic forces and public policies interacted to create powerful pressures for enlargement of farm size. When coupled with the explosive growth in agricultural export demand and sustained general inflation in the 1970s, this generated a belief that farmland prices could only rise. This was widely echoed by farm investment counselors, extension workers, and credit agencies. The result was a boom in land prices comparable to a 100-year flood, and unlike anything experienced since the days of railroad building in the nineteenth century.
>
> From 1970 to 1980 the average owner-occupied non-condominium home in Texas appreciated $225 per month. Many home owners had virtually "free" housing, in that appreciation exceeded monthly payments for much of the decade.
>
> The same statement could be made about farmland in many parts of the country. The average estimated value of Minnesota farmland increased from $232 per acre in 1970 to $1,310 per acre in 1981, an average increase of $108 per acre per year. This was far above the average imputed rental rate plus property taxes for each of the ten years.

By 1981 Minnesota land-owning farmers, together with those in most of the Middle West, had had ten years of experience with "free lands" in terms of asset values. In many areas the land was more than free, in that the appreciation in land values was virtually double the amount of imputed rent plus property taxes for the decade.

In financial terms the experience was demoralizing. The net worth statement overshadowed cash flow in financial planning, leading many farmers to use credit supported by land value appreciation to purchase farm equipment or additional land at prices that could not be justified by net cash income. Using this definition, "free land" was a trap into which many farmers and their creditors fell.

The sensitivity of U.S. agriculture to world events is in large part a result of the irrational expectations of inexhaustible export market demand that characterized the 1970s, and that was immediately capitalized into land values. As a consequence, we have a population of farm expansion buyers from the land boom of the 1970s that holds over-priced land.[6]

Summary

The focus of this chapter has been a theoretical examination of some of the major economic forces facing Prairie agriculture. The discussion suggested that the falling real price of agricultural products, the tremendous volatility in agriculture, and the capital intensity of the industry have combined to create conditions where boom-and-bust cycles can have a very severe impact on the agricultural sector.

In particular, the purchase of farm assets during periods of unsustainable expectations can lead to insurmountable problems – low incomes and falling asset values – for the industry. Farming is a high-risk business, and purchasing land is even more high-risk: buying land at the wrong time and the wrong price can literally bankrupt a farmer. Thus one of the things that agricultural policy should be concerned with is the stabilization of asset values. The next chapter provides the rationale behind this important goal for agricultural policy and suggests other things that agricultural policy should also be addressing.

6 Canadian Agricultural Policy

The previous chapters described the salient features of Prairie agriculture and outlined a number of the major economic forces that influence production, prices, and incomes in that sector. The make-up of Prairie agriculture, however, is also influenced by the agricultural policies and programs that have been put in place over the years by federal and provincial governments.

The purpose of this chapter is to examine some of the reasons that governments have become involved in agriculture and to outline the criteria by which we believe agricultural policy in Canada should be evaluated. The major agricultural programs in Canada, which are the result of this intervention, are described in Chapter 7. The effects of these programs are examined and evaluated in Chapter 8.

Government-Policy Intervention

There are two prevailing, though not exclusive, views on why governments have intervened with policies and programs in agriculture. The traditional view is that government becomes involved to serve the public interest and increase public welfare: to create the greatest good for the greatest number. Such intervention may be for the purpose of making the market more effective (e.g., supplying insurance, regulating monopolies), improving the distribution of income (e.g., transferring income to the poor), providing goods that cannot be supplied by private individuals (e.g., education and research), or correcting the negative impact of various market outcomes (e.g., guarding against soil erosion).[1]

The alternative view is that government intervention is in response to political pressure by individuals or groups. This is known as "rent seeking" and suggests that people recognize that governments have the power to increase or decrease the welfare of specific groups in society through the legislation they introduce. As a result, individuals or groups with common interests (i.e., interest groups) lobby politicians for regulations and programs that are favourable to them. In exchange for such regulations, the interest groups provide the government with support (financial or political) and legitimacy (i.e., the government can point to a large group that agrees with what the government is doing). This description suggests that policies that are highly beneficial to a small group, even though they may have an adverse effect on society as a whole, can be achieved by the political process if the group is well organized and well funded.

Many other factors, of course, are important in explaining how agricultural policy is introduced and maintained. Personalities, philosophical principles, and politics all play an important part, both currently and historically. The federal nature of Canada has also influenced agricultural-policy formation, since both the federal and provincial governments have jurisdiction over agriculture.[2]

Public-Interest Intervention

One of the best examples of the public-interest view of government intervention in Canadian agriculture is agricultural research. Numerous studies have shown that the public rate of return to government-funded crop-breeding research is high.[3] In other words, research programs to improve crop yields have provided benefits to Canadian producers and Canadian consumers that have far exceeded the cost of such programs.[4] Despite these high rates of return, no single producer or consumer could afford to undertake the research themselves, since they would have to incur the entire cost but yet would only be able to appropriate a small fraction of the total benefit. Thus it is correctly left to government to supply this public good.

While research may create substantial public benefits, individual producers may nevertheless find themselves disadvantaged as a result of the increased yields and higher production. Recall from Chapter 5 that, over time, a continual increase in the supply of agricultural products as a result of technological progress caused the real price of agricultural products to fall. That also causes farmers' incomes to decline unless they can adopt the technology fast enough to stay ahead of the game. Since all farmers cannot do that, the result is a chronic income problem for a major portion of agriculture. Alleviation of this chronic income problem, which was created as an externality of research, has properly been seen as one of the roles of government policy.[5] Specifically, the argument is that the consuming public (both in Canada and around the world) reaps the benefits of lower food prices; thus they should be the ones to compensate farmers for their efficiency.

The basic underlying conditions of agriculture described above also create the tremendous volatility and uncertainty found in agriculture – conditions that serve as additional reasons for government intervention. It is argued that instability reduces net social welfare and causes large and arbitrary redistributions of income. Government policy that can reduce that instability therefore provides a public good.[6]

Rent-Seeking Intervention

While government intervention in the agricultural economy can provide social benefits, it can also lead to costs. In particular, agricultural policies must be examined to see that they are not causing resources to be used in an inefficient manner. Resource misallocation will occur when price or output deviates from what it would otherwise be if all markets in the economy were competitive and free of externalities. Resource misallocation implies that if resources were to be allocated in some other manner, a greater level of economic well-being could be obtained.

The question of the effect of policy on resource allocation is closely tied to the distinction between the public-interest and rent-seeking views of agricultural-policy formation. If a policy is implemented for public-interest reasons, the assumption is that the policy will make the industry more competitive or will correct a market externality. In other words, policies implemented for public-interest reasons can be expected to improve the allocation of resources in the economy.

On the other hand, if policies are implemented to satisfy the needs of a particular group in society (i.e., rent seeking), the expectation is that they will be moving the economy away from the competitive benchmark. For instance, if a policy causes the price of a particular commodity to be raised above the competitive level (in order to raise incomes for the producers of that commodity), the increase in output that results will lead to too many resources being devoted to the production of that good.[7]

The process of rent seeking can also cause resource misallocation in and of itself. In an effort to lobby government to have legislation passed that is favourable to them (or to resist legislative changes that would deprive them of a benefit), interest groups have to incur considerable expense. It is argued that this expense is a waste of resources, since it does not produce anything of value.[8] Indeed, should the lobbying effort be successful, the end result could be a program that would lead to resource misallocation. Other views, however, are also expressed. In particular, rent seeking is seen as a way for government to learn the views of the various groups in society, to obtain the specialized information necessary to pass legislation, and to build support for the programs that it introduces.[9]

In empirical analysis of rent seeking and its effects, the assumption is usually made that all markets in the economy, with the exception of the one being studied, are perfectly competitive. Unfortunately, that proposition is rarely tested. For example, analysis of supply management almost always starts with the assumption that the Canadian economy is competitive and that the only deviation from that is the supply-managed industry. The assumption that all other industries are competitive, while the one being studied is not, is extremely important, since once it is made, the conclusion that rent seeking will cause a misallocation of resources is already reached.[10]

Criteria for Policy Evaluation

The discussion above suggests a number of criteria with which to evaluate Canadian agricultural policy. For the purposes of the current study, we wish to focus on two of them:

- the effectiveness of agricultural policy in reducing farm-income variation; and
- the effectiveness of agricultural policy in promoting efficient resource allocation.

In addition, however, we would like to add four other criteria, two of which are closely linked to the above:

- the effectiveness of agricultural policy in reducing farm-asset price fluctuations;
- the effect of agricultural policy on the international agricultural market;
- the effect of agricultural policy on income distribution within agriculture; and
- the effect of agricultural policy in providing spinoff effects to other sectors of the economy.

The reasons for adopting these last four criteria are examined below.[11]

Reducing Asset-Price Fluctuation

As earlier chapters have emphasized, there is a close link between income variability and farm-asset price variability.

In particular, fluctuating asset values, if accompanied by changes in farm debt, can be a major source of the variability in income. Reducing the fluctuations in asset values, therefore, can be expected to assist in achieving more stable incomes.

In particular, highly unstable asset values can be expected to result in large and arbitrary redistributions of income. For instance, farmers who purchase land in boom periods and who are forced to sell during market downturns will suffer income and capital losses, while those who are able to buy during weak markets will be able to earn large capital gains. This income redistribution, however, is not expected to make the agricultural sector any more efficient, since there is little evidence to suggest that farmers who are forced to leave agriculture in that manner are any less efficient than those who subsequently enter.[12] In fact, many of the people who are forced to give up their land because of foreclosure remain in farming by leasing the land back from the financial institution, further emphasizing the point that the main result of asset fluctuations is a redistribution of income.[13]

In addition, the fluctuations in asset values seen in agriculture usually do not imply any change in productivity. For example, an acre of land that is worth $500 is just as productive (in terms of the physical amount of grain it can grow) as when it was worth $1,000, provided that all that has changed in the interim is the price of the grain grown on it.[14] Thus from an economic-efficiency perspective, there appears to be little reason for land prices to fluctuate dramatically.

While agricultural-policy analysts have concerned themselves with the volatility and level of income (as discussed above), the problem of fluctuating asset values has been largely neglected.[15] That is primarily because it was never distinguished from the income problem, to which, of course, it is closely related. As Chapter 3 pointed out, the volatile nature of agriculture may mean that, in addition to the fluctuating-incomes problem, the sector faces an equally chronic debt problem.

A good example of the failure to recognize the debt problem is the 1969 Report of the Federal Task Force on Agriculture. That report provided a very comprehensive review of Canadian agriculture and was specifically commissioned to examine the severe problems that the industry was experiencing in the late 1960s. The Task Force was very concerned about low and unstable incomes. In fact, its main recommendations suggested the establishment of programs that would stabilize the price and output of the major agricultural commodities in Canada. Although never implemented in the manner suggested by the report, the recommendations did serve as a model for the program that was eventually established under the *Western Grain Stabilization Act*.

The problem of debt, however, was never raised in the Task Force report. In the section of the report dealing with credit, the Task Force saw the main problem as that of how to provide additional credit to farmers so that they could continue to invest, increase their farm size, improve productivity, and enter agriculture. The failure to address the question of debt and how it might be solved is all the more remarkable if one considers that in 1967, farm debt as a percentage of investment in farm real estate, machinery, and livestock had reached a level of 18.2 – up from 12.5 in 1960.[16] In 1981, that ratio stood at 13.5; in 1984, it had risen to 16.8.[17] The real price of land around 1969 was also down substantially from the level in the early sixties, suggesting yet another parallel to the situation in the late 1980s. In other words, fluctuating asset prices and high debt levels appeared as a problem in 1969, although the importance of both to the health of the agricultural industry had not yet been fully appreciated.

International Agricultural Markets

As Chapter 2 pointed out, the crisis facing Prairie agriculture is largely the result of the domestic policies of the major grain- and oilseed-trading countries. The direct effect of these policies has been to increase agricultural production, lower the world price, and cause inefficiency in the use of the world's agricultural resources.[18]

As the ramifications of agricultural programs are felt in the international market, the indirect effects of those policies become equally disruptive. The increased output of exporters like the European Community, for example, has had an impact on the market share of other countries such as the United States. One of the responses to that has been retaliation – a good example being the Export Enhancement Program of the United States – which has further disrupted international trade.[19] Canada has also responded to conditions in the international market. The Special Canadian Grains Program is an illustration of how protection by Canada's trade competitors led to protection in Canada itself.

The impact of domestic agricultural policy on the international market is not limited to grains and oilseeds. The Japanese market for hogs and beef, for instance, is highly protected, which makes it difficult for products from other countries to be exported to that market. That is particularly true for Canada, since Japan appears to discriminate against

Canadian products, especially beef.[20] Protectionist measures have also arisen in the North American livestock market, with Canada and the United States periodically introducing trade restrictions in an effort to protect their domestic producers from each other's exports.

In short, the domestic policies of countries can have an impact on the efficiency of agricultural resource use in the world, the health of the international agricultural market, and the actions of other countries. While the sheer size of the United States and the EC means that their impact is much larger than that of countries such as Canada, Australia, and Argentina, it is nevertheless important to examine the effect that Canadian agricultural policy can have on the international market. That is particularly so, given Canada's role in agricultural trade reform. As one of the leaders of the Cairns Group and a member of an Organisation for Economic Co-Operation and Development (OECD) committee promoting agricultural trade reform, Canada has been a strong advocate of the position that domestic agricultural policies are at the root of the problems facing international agriculture.[21] Canada has also been active in the Uruguay Round of GATT, which is presently attempting to achieve greater liberalization of trade in agriculture.[22]

The issue raised by GATT is the degree to which the agricultural policies of a country distort, or have an effect on, international agricultural trade. Generally speaking, this means that any policy or program that is not market-oriented – i.e., one that permanently subsidizes or protects certain activities or industries – is likely to be subject to change under a successful GATT agreement. In terms of the countries that Canada trades with, this means that programs like the CAP in the EC and the export subsidies of the United States would have to be altered. In order to secure those changes, however, Canada would have to modify some of its programs. Warley argues that Canada's trading partners will expect to see changes in such programs as the national dairy policy, the tariff and nontariff measures used to protect the horticultural and food-processing industry, the procurement and "domestic-content" provisions of the provincial liquor commissions, and the transport subsidies to grain and other regulated products.[23]

While the market orientation of agricultural programs will be examined under GATT, that may not be the only criterion. A number of countries are arguing that programs like supply management should be exempt from the GATT negotiations. The reasoning is that while such programs distort production, they are effective in reducing the world output level. If they can be designed to ensure some level of market access and to provide some guarantee of market share for exporting nations, they may be allowed to remain under a GATT agreement.[24]

The outcome of the discussion on this point is particularly important for Canada. Canada provides a great deal of support to farmers through supply management – support that would have to be removed or provided in some other fashion should GATT decide that such programs are not allowable. Thus a fundamental part of Canada's agricultural policy is at stake in the GATT negotiations. The impact on Canada of such a decision goes beyond the producers of supply-managed commodities, however. Hog and beef producers, for instance, will be affected, since a decision to allow supply management would mean that the Japanese market would never be fully opened to them.

In summary, an evaluation of the impact of Canadian agricultural policy on international trade must examine the degree to which a program is market-oriented, as well as the degree to which it is production-distorting. As pointed out above, the degree to which a program is market-oriented is reflected in the degree to which the program promotes efficient resource allocation. Thus this particular aspect of the trade component of agricultural policy is captured in the second criterion for policy evaluation proposed above. While the degree to which a program influences production is often reflected in that criterion, it is nevertheless useful to evaluate this component separately. That is the purpose of the international-market criterion.

Income Distribution

It was pointed out above that one of the reasons for stabilizing income was to avoid large and arbitrary redistributions of income between farmers. If agricultural programs are introduced to stabilize income (and hence prevent large redistributions of income), it is useful to examine the degree to which this secondary goal is obtained.

Spinoff Effects

The concern with the spinoff effects of agricultural policy comes from the recognition that agricultural policy has an impact on more than just the primary agricultural-production sector. As noted in earlier chapters, the crisis in Prairie agriculture has had an impact on farm-input suppliers; rural communities; financial institutions; and, indeed, the general economy. It is therefore important to address the degree to which agricultural policy may affect some of those industries and sectors, particularly when the expressed goal of some of the agricultural programs (e.g., the WGSA program) is to act as a stabilizing force on the entire Prairie economy, not just agriculture.

Summary

The purpose of this chapter was to review some of the reasons that governments have become involved in agriculture and to outline criteria by which agricultural policy in Canada should be evaluated. It was argued that there are a number of reasons why government has become involved in the agricultural industry. Publicly funded agricultural research has traditionally provided high rates of return to society, suggesting that this is an activity that should be supported. The benefits from research, however, are not equally distributed between consumers and producers. As a result, compensation should be provided to producers if they have been made worse off as a result of increasing their efficiency. Governments have also become involved in agricultural policy as the result of rent seeking which, if not closely monitored, could lead to market inefficiencies and resource misallocation.

The degree to which Canadian agricultural policy provides public benefits and promotes efficient resource allocation forms the basis for the evaluation criteria developed in this chapter. The criteria selected, however, also reflect a number of other concerns raised in earlier chapters, including the effectiveness of agricultural policy in reducing fluctuations in farm income and agricultural land values, the impact of agricultural policy on the international agricultural market, and the effect of agricultural policy in providing spinoff effects to other sectors of the economy.

The criteria developed in this chapter will be applied to the major agricultural programs that had an effect on Prairie agriculture during the 1970s and 1980s. The essential features of those programs are outlined in the following chapter, while analysis of the programs on the basis of the criteria developed in this chapter is carried out in Chapter 8.

7 Canadian Agricultural Programs: An Overview

The governments of Canada have played a major role in Prairie agriculture over the years. In the early years of Prairie development, farmers' concerns were directed at what they perceived to be monopoly control of the grain-handling and marketing system. The federal government responded to producer demands for a more competitive system by introducing grading standards and legislation licensing railway practices.[1,2] The provincial governments also played a role, primarily in helping to finance and establish a set of farmer-owned elevators in the three Prairie provinces.

After the First World War, farmers shifted their efforts from attempting to make the existing system more competitive to requesting a monopoly agency that would market their wheat. Underlying those demands was the belief that Canada was a large enough exporter to be able to influence the price of wheat on the world market. When the federal government refused to re-establish the Canadian Wheat Board (CWB), which had originally been established immediately after the war, farmers directed their attention to establishing marketing co-operatives. When that experiment ended with the collapse of the wheat market in the 1930s, farmers again turned their efforts to obtaining a government-owned central selling agency for their grain. In 1935, the CWB was reintroduced by the government of Canada as an alternative to the open market. Despite efforts by the government to disband the CWB in 1939, it was retained; and in 1943, as part of the war emergency measures, the CWB once again became a monopoly purchaser of wheat.[3,4]

The formation of the CWB marked the end of a period during which Canadian farmers were concerned, first, with the efficiency of the grain-handling system and, second, with the ability to exercise whatever power Canada possessed in the international grain market. During the next 20 years, there were few major policy developments in the Prairie grain economy.[5] Grain prices were relatively stable (see Chart 1-1), and Canada remained a major player in the world market.[6]

As might be expected in such an environment, the major policy concerns centred around the major institutions in Prairie agriculture. For instance, in the late 1960s and early 1970s the main policy questions being asked concerned: the efficacy of the CWB versus that of the U.S. open-market system; the reason that Canada was losing market share in the international market; whether or not canola should be marketed under the CWB; and how the marketing of domestic feed grains should be organized.

Since 1970, a number of changes have occurred in the Prairie grain economy. First, the emergence of Australia and Argentina (and later the EC) as major grain producers meant that Canada lost some of its power in the world wheat market.[7] Second, the international grain market became much more volatile and uncertain.[8] In this new environment, Canada no longer had the same ability to influence price and stabilize the market as it had had prior to 1970. With the CWB and the other institutions unable to meet Canada's policy needs fully, the country began to alter its mix of agricultural policies and programs.

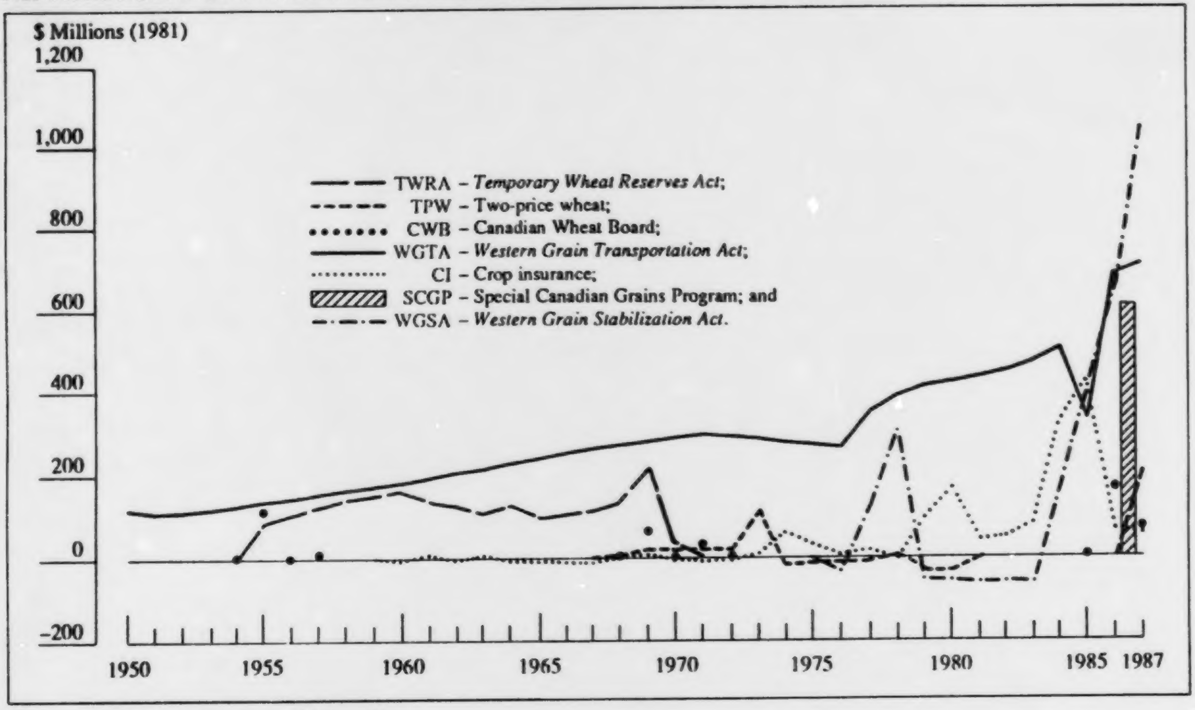
The new programs for the grains sector stressed stabilization, along with some degree of price support. Two-price wheat was introduced; crop insurance was made more comprehensive; and the WGSA was established. Similar changes were also being made in the non-grains sector. The *Agricultural Stabilization Act* (established in 1958) was strengthened; the *Farm Products Marketing Agencies Act* was established (giving poultry producers the right to manage supplies of their products); the dairy program was modified; and provincial governments introduced stabilization programs for livestock.[9]

Chart 7-1 illustrates graphically the change in the program and policy mix for the grains sector. Of the programs that have been in place since 1950, transfers under the Crow Rate (hereafter referred to as "the Crow") and now under the *Western Grain Transportation Act* (WGTA) constituted the largest proportion of total transfers to producers over most of that time period. Note the use of the word "transfer," since while the Crow involved a saving to farmers in terms of a lower freight rate (and hence a transfer of income to farmers), it did not involve any direct expenditure on the part of the government.

In the period 1955-70, only one other program, the TWRA program under the *Temporary Wheat Reserves Act*, involved any major transfer to Prairie farmers (see Chart 7-1); because the program is no longer in effect, it will not be examined any further. Since the late 1960s, however, other programs have

Chart 7-1

Net Transfers to Prairie Producers under Selected Government Programs, 1950-87



Source Based on various sources of information.

at times involved considerable transfers to Prairie producers. Losses in the CWB pools represented a source of payment to Prairie producers in the late 1960s and again in 1987. Crop insurance (CI) was an important component of transfers to farmers in the late 1970s and again in the early 1980s. Payouts under the WGSA involved transfers during the period 1977-79 and again in the period 1984-87.

It was not until the 1980s, however, that any of the agricultural programs gave rise to transfers that equaled or surpassed those of the Crow/WGTA. In 1984 and 1985, poor weather conditions in the Prairies led to large payouts under crop insurance. In 1986 and 1987, government expenditures to agriculture increased sharply, primarily as a result of payments under WGSA and SCGP. Indeed, expenditures under those two programs, combined with increased payments under WGTA and two-price wheat (TPW), gave rise to record levels of transfers to Prairie agriculture.

The purpose of this chapter is to provide a brief description of the major government programs that have affected Prairie agriculture during the 1970s and 1980s. As will be seen, the major involvement of federal and provincial governments in the agricultural industry during that period has centred around those programs, which have typically been directed at stabilizing output and income or at reducing the cost of inputs such as credit and transportation.

Western Grain Transportation Act

The *Western Grain Transportation Act* cannot be fully understood without a knowledge of "the Crow Rate." The Crow's Nest Pass Agreement and Rates, as it is correctly known, was introduced in 1897 as one of the instruments to be used in the economic and political development of the newly formed country of Canada. To ensure that minerals discovered in southeastern British Columbia would be transported through Canada and not to the United States, the federal government provided a subsidy to the Canadian Pacific Railway Company for the construction of a railway into that region. As part of its commitment, the Railway agreed to reduce the freight rates on grain and flour moving eastward out of the Prairies and on certain settlers' effects moving into the West.[10]

The components of the Crow reflected the primary objectives of the government of the day – namely, to integrate economically the Canadian economy, to encourage the development of the West (and, in the process, increase the demand for goods produced in central Canada); and to provide inexpensive food for the population of central Canada (and, in the process, increase the demand for the raw goods produced by western Canada).[11]

Although the details of the Crow were changed from time to time, the primary features remained the same: the rate at which grains and oilseeds could be shipped out of western Canada (known as "the statutory rate") remained fixed.[12] As time passed, the railways contended that those rates were too low to cover the costs of an adequate and efficient transportation system. As a result, the federal government stepped in to pay for branch-line maintenance, while both the federal and provincial governments undertook the purchase of railway cars. Livestock producers and processors of grain products in the Prairies also argued that the Crow was penalizing their operations, since the low transportation charges were raising the price of grain in the Prairies, thereby increasing the cost of such operations. In fact, livestock feeders believed they were facing a double deterrent, since feed-grain shipments to central Canada were being subsidized under the Feed Freight Assistance Program, resulting in the shipment of feeder cattle to central Canada for finishing.

The rising cost to the federal government of branch-line maintenance and the increased demands for a policy change from the railways, livestock producers and processors, and selected grain groups finally led the federal government to enact new legislation. In November 1983, the *Western Grain Transportation Act* was passed, replacing the Crow. Under the Act, the federal government provides the railways with an annual payment of up to $658.6 million (plus an inflationary index) to cover the transportation of eligible grain from Prairie shipping points to Thunder Bay, Churchill, Vancouver, and Prince Rupert.[13]

The $658.6 million is referred to as "the Crow Gap," and an estimate of the shortfall in revenue experienced by the railways in moving grain at the statutory rates at the time the legislation was passed. In years when exports are low because of poor crops or slow sales, the payout under WGTA may be less than $658.6 million because the volume moved would be small. The amount paid out each year is calculated on a dollar-per-tonne-moved basis and varies with the distance to port within the Prairie region.

Payment of the Crow Gap to the railways is a contentious issue. A number of groups, particularly livestock producers, contend that the $658.6 million should, instead, be paid to producers. Payment of the Crow Gap in that manner would result in higher freight costs to Prairie grain farmers, thus reducing the final price received for grain. The lower price would benefit livestock producers, while the farmer who grew the grain would be reimbursed directly as a result of the government payment. Those who oppose that method of payment argue that paying the producer directly increases the visibility of the program, thereby increasing the probability that it will eventually be done away with. They also argue that paying the producer increases the power of the railways to charge higher rates, especially on the branch lines.

Other methods of paying the Crow Gap have also been put forward. One that has received some attention is the idea of a "Crow Bond." Under that proposal, WGTA would be eliminated, and the cost of rail transportation would no longer be subsidized. In order to compensate farmers for the loss of the program, however, a lump-sum payment would be paid to those who were actively farming at the time the program was eliminated. The size of the lump-sum payment would be determined as the present value of the stream of transfers that would have been made under WGTA had it been continued – i.e., the present value of the Crow Gap.

Western Grain Stabilization Act

The *Western Grain Stabilization Act* was introduced in 1976 to stabilize the net cash flow from the major grain and oilseed crops in the Prairies. The goal of the program was to avoid a repetition of the economic downturn of the late 1960s, caused by declining international grain prices and sales, and to protect the infrastructure of the Prairie agricultural economy.

The program is voluntary; those farmers who choose to join contribute a percentage of their gross sales (up to a maximum of $60,000) to the stabilization fund. Prior to the summer of 1988, the producer levy ranged between 1 and 3 per cent, depending upon the balance in the stabilization fund. A large accumulated deficit in the fund, however, prompted the government to change the producer levy for the 1988/89 crop year to 4 per cent. The change was also made retroactive to the 1987/88 crop year. In future years the producer levy will fluctuate between 2 and 4 per cent, again depending upon the balance in the fund. The federal government matches the producers' contributions and contributes an additional 2 per cent of gross sales.[14]

The crops eligible under the program have also changed over the years. From the inception of the program and prior to the summer of 1988, the seven major crops grown in the Prairies – namely, wheat (including durum), oats, barley, rye, flax, canola, and mustard – were eligible under the program. Under legislation passed in the summer of 1988, the program's coverage was extended to include the following special crops: triticale, mixed grains, sunflower seeds, safflower seeds, buckwheat, peas, lentils, faba beans, and canary seed. That change was also made retroactive to the 1987/88 crop year.

While all the major grains are eligible for stabilization if they are sold off the farm, grain fed to livestock on the farm where it is produced is not eligible for stabilization. Landlords (those who own land but do not actively farm it) cannot participate in the program. Payouts from the program are triggered when the net cash flow from the seven major grains in the Prairie region falls below 90 per cent of the previous five-year average net cash flow. The payout to individual producers is determined by their levies in the current and previous two years.

Payouts to the Prairie region amounted to $223 million, $522 million, $859 million, and $1,398 million for the crop years 1983/84 to 1986/87, respectively. Over that same period, producers contributed $54 million, $46 million, $30 million, and $27 million, and the government contributed $117 million, $106.2 million, $89.7 million, and $82.2 million, respectively.[15] The large payments in the period 1985-87 drove the stabilization fund into a large deficit. In December 1987, the federal government announced a $750-million injection into the stabilization fund. This debt write-down was officially approved as part of the legislative changes made to WGSA during the summer of 1988. Even with that reduction in debt, however, the stabilization account is in a large deficit position.

The purpose of WGSA is to stabilize regional net cash flow. One of the implications of this is that the income of individual producers may not be stabilized. That would be the case, for instance, if a group of farmers had a poor crop, while the Prairie region enjoyed a good crop and relatively high prices. Even if those farmers had crop insurance, they would not fare as well as if the poor crop extended over a wide enough area to trigger WGSA payments.

As noted above, several modifications to WGSA were made in the summer of 1988. In addition to the ones noted above, those changes included: removal of the 10-per-cent payment penalty for those producers who rejoin the program; reinstatement without penalty of those producers who did not participate during 1987/88 but who now wish to do so; provision for any participant in the program to withdraw, effective August 1, 1988; and the requirement that all designated purchasers deduct the levy from their grain purchases.[16]

Crop Insurance

The federal and provincial governments have, for some time (the first crop-insurance program was introduced in 1961), provided a program of all-risk crop insurance to protect farmers against yield loss. Crop insurance provides insurance for losses caused by natural hazards, such as drought, frost, floods, fire, hail, insects, and plant diseases. The list of crops eligible for insurance has been expanded since the inception of the program. Saskatchewan provides insurance coverage for the following crops: wheat (including durum), oats, barley, flax, canola, rye (spring and fall), sunflower seeds, mustard, utility wheat, field peas, lentils, and canary seed. In Alberta, coverage is also provided for pedigree seed, grain corn, sugar beets, dry beans, seed peas, safflower, potatoes, alfalfa for processing, and honey production. Manitoba's list is similar to Alberta's, with the exception of a few additions such as soybeans, flood protection for unseeded land, livestock feed security, and forage and tame-hay establishment.

Crop insurance is essentially a production guarantee, with the guarantee level being dependent upon whether the crop is grown on summer fallow or stubble, upon the risk area that the farmer is located in (i.e., the class of soil in which the crop is grown), and upon the degree of protection the farmer wishes to obtain (60 or 70 per cent). If the farmer fails to achieve that production level, crop insurance will make up the difference. In order to translate the production shortfall into a dollar amount, a dollar value per bushel is used; that value is linked to the market conditions each year.

The premium paid by farmers is linked to the level of coverage and to previous performance records (i.e., the record of claims). Producer premiums are matched by the federal government, while each provincial government in the Prairie region pays the administration costs of the program in its own province. The program is voluntary.

As an example of how the program works, a farmer near Saskatoon in 1988 could be insured for spring wheat at 24.3 bushels per acre on summer fallow and 18.2 bushels per acre on stubble. The premiums for that coverage would be approximately $3.20 per acre for the summer-fallow crop and $2.40 per acre for the stubble crop. If the producer planted 620 acres, the total premium would be $1,736.[17] If the farmer failed to obtain the insured yields, an insurance payment equal to the difference between the insured yield and the actual yield, multiplied by $2.99 per bushel, would be paid. Thus if actual summer-fallow and stubble yields were 14.3 and 8.2 bushels per acre, the farmer would receive a payment equal to $18,538.

The average annual cost to the federal government for crop insurance in the Prairie provinces over the five-year period 1982/83 to 1986/87 was $228 million. The 1988 drought is expected to result in payouts of at least $500 million for Saskatchewan alone.[18]

It is important to stress that crop insurance does not necessarily provide income insurance. The prices at which the yields can be insured vary from year to year, according to market conditions. Hence for the 1987/88 crop year, coverage is lower than it might otherwise have been, as a result of depressed grain prices. For instance, while the drought in 1988 was much more severe than that in 1985, the total payments in 1988, compared with those in 1985, will not reflect that difference because the prices at which the 1988 crop could be insured were significantly below the prices for 1985.

Special Canadian Grains Program

The Special Canadian Grains Program was introduced in December 1986. It provided a $1-billion cash payment to Canadian grain and oilseed producers. The purpose was to cushion the impact on grain and oilseed producers of the subsidy war between the United States and the EC. The program made two payments in 1987 of $300 million and $700 million. Of the total amount, approximately $860 million went to western Canada.

Payments under the program were based on the acreage that the farmer seeded to designated crops in 1986, on the regional crop-insurance yield, and on the relative price decline (for each commodity) that was attributable to the trade war. The maximum payment to any individual was $25,000. Regional yields were calculated by averaging the yields of the three best years out of five (including the current and previous four years). The crops covered under the program included wheat (including durum), barley, oats, rye, mixed grains, corn, soybeans, canola, flax, and sunflower seeds.[19]

In December 1987, the federal government announced additional payments under SCGP, totalling $1.1 billion. Payments under the program were made in 1988, with the first payments having arrived before seeding in the spring. In total, producers in the Prairie region received $942 million.

The basis of the payout under the revised program is somewhat different than it was under the original program. Payments under the 1987 plan were based on the acreage that the farmer seeded to designated crops in 1987, with the list of designated crops expanded to include dry peas, mustard, lentils, canary seed, safflower, buckwheat, field beans, faba beans, honey, alfalfa for processing, as well as summer-fallow acreage (one acre of summer fallow counted for one-third of an acre of crop). The maximum amount that any producer can receive remains at $25,000.

Two-Price Wheat

The two-price wheat program was introduced in 1967 for the purpose of stabilizing the price of wheat to Canadian producers and consumers. The program was designed so that if the Canadian wheat export price fell below a specified domestic floor price, then Canadian consumers were to pay the floor price and, in effect, subsidize domestic producers. If the export price rose above a specified ceiling price, then consumers were to pay the ceiling price, with the subsidy flowing from producers to consumers. If the export price fell between the ceiling price and the floor price, then the domestic and export prices would be equal, and no group would receive a subsidy. Historically, both producers and consumers gained as a result of TPW. In the late 1960s and early 1970s, producers gained at the expense of consumers and the government; in the late 1970s, consumers gained at the expense of producers.

In August 1986, a revised domestic wheat policy allowed the CWB to establish the domestic price at anywhere between $6.00 and $11.00 per bushel, thereby effectively terminating the old concept of a band in which the domestic price would fluctuate. Under that legislation, the domestic price was set at $7.00 per bushel.

Domestic consumption of hard red spring wheat is somewhere between 10 and 15 per cent of total Prairie production.[20] With the domestic price of $7.00 per bushel having been much higher in 1987 than the world price of approximately $2.60 per bushel, Prairie farmers received a benefit of roughly $4.40 per bushel on 15 per cent of the wheat they grew. For the farmer producing 18,000 bushels near Saskatoon, the two-price wheat program would have provided an additional revenue of approximately $10,000 to $12,000 per year. Note that while the farmer benefited from TPW in 1987, there were periods in the past (e.g., in the late 1970s) when the program was a cost to the Prairie farmer.

In late 1987 and early 1988, discussions on abolishing the TPW program began in what appeared to be a response to the Canada-U.S. Free-Trade Agreement. On August 1, 1988, the TPW system was removed, with the result that the selling price of wheat for human consumption in Canada is now based on the world market price. To compensate for the loss of income caused by the price drop, producers will receive the full benefit of the TPW policy for the 1988/89 crop year. The payment will be determined by calculating the difference between $7.00 per bushel and the average domestic selling price of wheat stored in Thunder Bay.[21]

Agricultural Credit

The federal and provincial governments have been large suppliers of credit to the agricultural sector. At the federal level, credit is supplied by the Farm Credit Corporation (FCC). The purpose of FCC has been to enable new farmers to enter agriculture and to supply smaller existing farmers with funds for expansion. The FCC has been a major lender for farm mortgages in the Prairies. As of August 31, 1988, outstanding FCC loans totalled $404 million, $1,552 million, and $633 million for Manitoba, Saskatchewan, and Alberta, respectively. A much fuller description of FCC and its role in providing agricultural credit is provided in Chapter 8.

Each of the Prairie provinces also has its own credit agency. These are used by the respective governments to provide credit to farmers at subsidized rates and to target credit at young farmers or at specific farm enterprises such as livestock. The provincial agencies are the Agricultural Credit Corporation (ACC) in Manitoba and Saskatchewan, and the Agricultural Development Corporation (ADC) in Alberta. The specific details of some of these programs will be discussed in the next chapter.

Other Programs and Policies Affecting Prairie Agriculture

Many other programs and policies were introduced over the years that have an impact on Prairie agriculture. In the grains area, they include cash advances and feed-grain policy; for livestock, the list contains stabilization programs, feed freight assistance, payments per head in times of drought, venture- and equity-capital arrangements, tax credits for cattle feeding, low-interest loans through the establishment of feeder associations, and subsidized grazing leases from both the provincial and federal governments. Two of those programs are outlined here.

Cash Advances

Under the cash-advance system, which is administered by the CWB, farmers holding valid CWB quota books can obtain interest-free loans (or cash advances) up to a maximum of $30,000. As collateral for the loan, the farmer puts up grain that is stored on the farm and that can be delivered under a CWB quota. The loan is paid back when the farmer sells the grain to the CWB by deducting the per-bushel cash advance from the initial price. As an example, producers were eligible for a $2.00-per-bushel cash advance in the 1987/88 crop year – an amount they could receive immediately after harvest. Given an initial price of roughly $2.60 per bushel, the producer would then receive an additional $0.60 per bushel upon the actual sale of the grain to the CWB. Assuming that a producer borrowed the full amount under the cash-advance program and that he or she obtained the loan approximately six months before selling the grain, the benefit to that farmer from the program would be $1,500.

Red-Meat Stabilization Programs

Stabilization programs for the red-meat sector have been established by both the federal and provincial governments. In the past, the federal government program came under the *Agricultural Stabilization Act* of 1975, which also covers most of the other major agricultural products in Canada. At the provincial level, stabilization plans were introduced by the individual provinces when the livestock economy turned down in the late 1970s and early 1980s. In the mid-1980s, discussions began about the amalgamation of the federal and provincial programs into a tripartite stabilization program. The three parties to the program are the federal government, the provincial governments, and the red-meat producers.

The federal ASA program required no producer levies and made payouts on the basis of a trigger mechanism related to historical market prices and the indexed cost of production. The tripartite program now being established will utilize joint federal, provincial, and producer contributions. Historical income margins are to be maintained through the use of a trigger mechanism tied to the level of income.

The provincial schemes (some of which are continuing and some of which are being phased out before entry into the tripartite program) were voluntary and often used producer contributions matched by the provincial governments. Producer levies to the programs ranged from 2 to 6 per cent of gross red-meat sales for the various programs in the Prairie provinces; those levies were increased when the stabilization fund accumulated a large deficit. Payouts under these programs were triggered by a cost-of-production formula.

While many of the other programs affecting livestock and grain production in the Prairies have had important impacts, it is believed that they are not as important as the ones included in earlier sections of this chapter. As a result, they will not be examined in any more detail in this study. The programs outlined in the earlier sections of this chapter will, however, be analyzed in greater detail in the following chapter.

Summary

The purpose of this chapter has been to provide an overview of the agricultural policies that were introduced in western Canada over the years. In the early years of this century, Prairie grain farmers were primarily concerned with the competitive nature of the grain-handling and marketing system. By the 1920s, that concern gave way to a demand for a monopoly selling agency that would be able to utilize the market power that Canada possessed in the world grain market. With the establishment of the CWB in 1935, that demand was largely met, and the main questions raised over the next 30 years concerned the efficacy of the institutions and regulatory mechanisms that had been established.

The increased volatility of the world grain markets in the 1970s, along with the emergence of other major exporters such as Australia and the EC, led to a change in Canada's policies. Although the Crow Rate continued to play an important role, it was joined by programs such as WGSA, crop insurance, and two-price wheat, all of which were designed to provide some degree of income insurance and income support. In other words, the 1970s saw a change in agricultural policy away from institutions and regulatory mechanisms that involved relatively little in terms of government transfers to stabilization programs that involved a financial commitment on the part of government as well as producers. The next chapter examines the impact that those transfer programs have had on Prairie agriculture.

8 Canadian Agricultural Programs: The Effects

The main focus of this chapter is a theoretical and empirical evaluation of the major agricultural policies outlined in Chapter 7 (see also Appendix C). The programs discussed in this chapter will be examined on the basis of the criteria developed in Chapter 6 – namely, income stabilization, resource allocation, agricultural-asset price level and stability, the international market, income distribution, and the economic spinoffs.

Empirical policy analysis in agriculture is difficult to undertake. One way to carry out such work is through the use of econometric models.[1] While a large-scale econometric model has been developed for Canadian agriculture, it is extremely complex and not easily simulated.[2] Instead, the approach taken in this study is to obtain estimates of the major economic parameters (e.g., supply elasticities) from various models that have been developed and use them to examine the effect of specific programs on Prairie agriculture. In carrying out the analysis, each program is examined in a static framework, under the assumption that there is no change in any of the other programs (an aggregate assessment of all the programs is presented in Chapter 9). While this method cannot be used to draw definitive conclusions regarding cause and effect in agricultural policy, it does provide an indication of what appears to be the most likely results of policy choices.

Western Grain Transportation Act

Chart 8-1 illustrates that in terms of the transfers that have been made to Prairie farmers, the major agricultural program affecting Prairie agriculture over the period 1950-87 was the Crow/WGTA.[3] While, at times, other programs (e.g., WGSA and SCGP) involved larger payments to producers, they were introduced or had their major effect only in the mid-1980s. Thus it could be expected that over the past two or three decades only Crow/WGTA would have had the potential to alter the production and land-purchase decisions of Prairie farmers.

This potential to affect the resource decisions of Prairie farmers is reflected in the long and heated debate that characterized discussions of the Crow over the period 1975-83. There are many twists among the positions taken. For some groups, the Crow was a burden on the western Canadian grain-handling system, reducing investment and limiting the export capability of the Prairies. For others, the Crow was the only way to ensure economical access to export markets for a region that is landlocked and dependent upon the services of the two railways. Still others believed that the Crow was a major deterrent to the livestock and processing industries in the Prairie region.[4]

Numerous studies have been undertaken on the impact of the Crow.[5] In recent years, most of them addressed the impact of changing the method of payment – i.e., of paying the Crow Gap directly to producers rather than to the railways. The question asked in this section is somewhat different: What would have been the impact on Prairie agriculture had Crow/WGTA not been in effect over the period 1950-87? While the estimates obtained in response to that question do not deal directly with the impact of changing the method of payment, they can nevertheless be used to provide some bounds to the answers that could be expected. These will be examined in the analysis below.

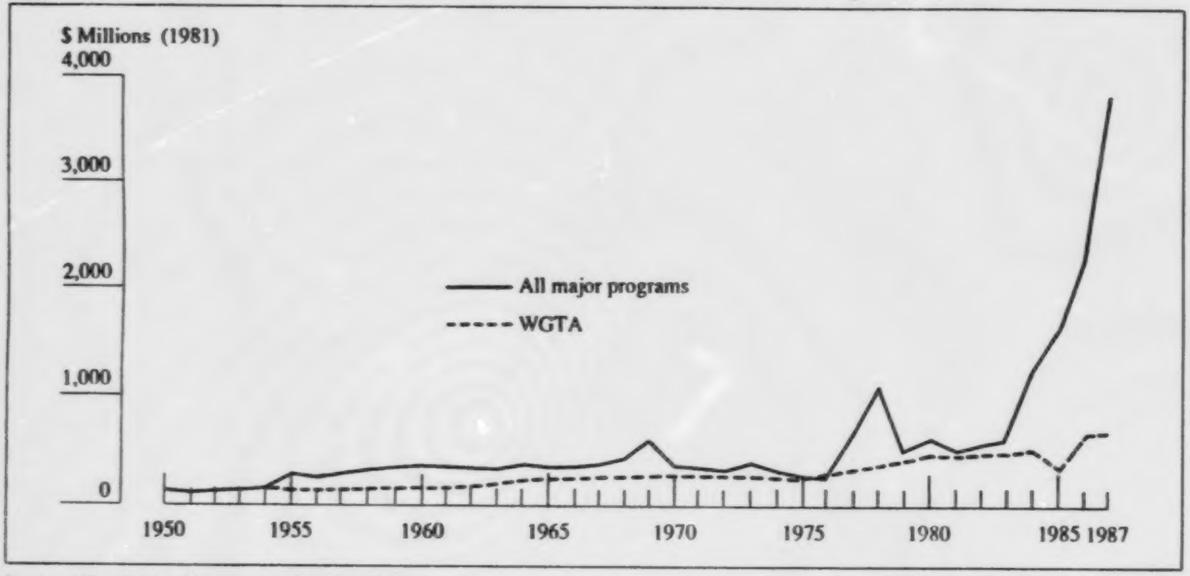
Resource Allocation

By lowering the cost of transportation, the effect of the Crow Rate (and its successor, WGTA) was effectively to raise the price of grains in the Prairies, regardless of whether the grain was exported or used locally. That could be expected to have had at least two interrelated effects. First, the production of grains eligible under Crow/WGTA may have been increased, since they were relatively more profitable than they would have been in the absence of the legislation. Second, the increased supply of grain, in conjunction with the higher cost, is likely to have had an impact on the livestock sector, which uses grain as an input.

To determine the impact of Crow/WGTA on the price of grains in the Prairies, it was first necessary to obtain an estimate of the monetary transfer made to Prairie farmers under that program. For the period prior to 1984, it was done by determining the shortfall in railway revenues that resulted from the Crow Rate being in effect, while the transfer figures for the period since 1984 are the actual government expenditures to the railways under WGTA.[6] Those figures are graphed in Chart 8-1. For the period before 1984, the transfer

Chart 8-1

Net Transfers to Prairie Producers under WGTA and All Major Government Programs, 1950-87



Source Based on various sources of information.

figures did not involve any government expenditures. Rather, the numbers represent an estimate of the total dollar value of the savings incurred by Prairie farmers as a result of having the transportation cost frozen at the statutory Crow Rate.

The second step involved determining the proportion of the Crow/WGTA transfers that were attributable to each of the major grains. That was done by calculating the proportion that each of the major commodities (wheat, oats, barley, flax, rye, and canola) constituted of the total volume of all six commodities shipped out of western Canada.[7] That percentage was then used to allocate the transfers under Crow/WGTA to the commodities. The Crow/WGTA transfer allocated to each commodity was then subtracted from the total value of production of that commodity, to arrive at the total revenue that farmers could have expected to receive had Crow/WGTA not been in place. Dividing the revised total-revenue figure by the production of each of the commodities resulted in an estimate of the price that would have been obtained had Crow/WGTA been removed.

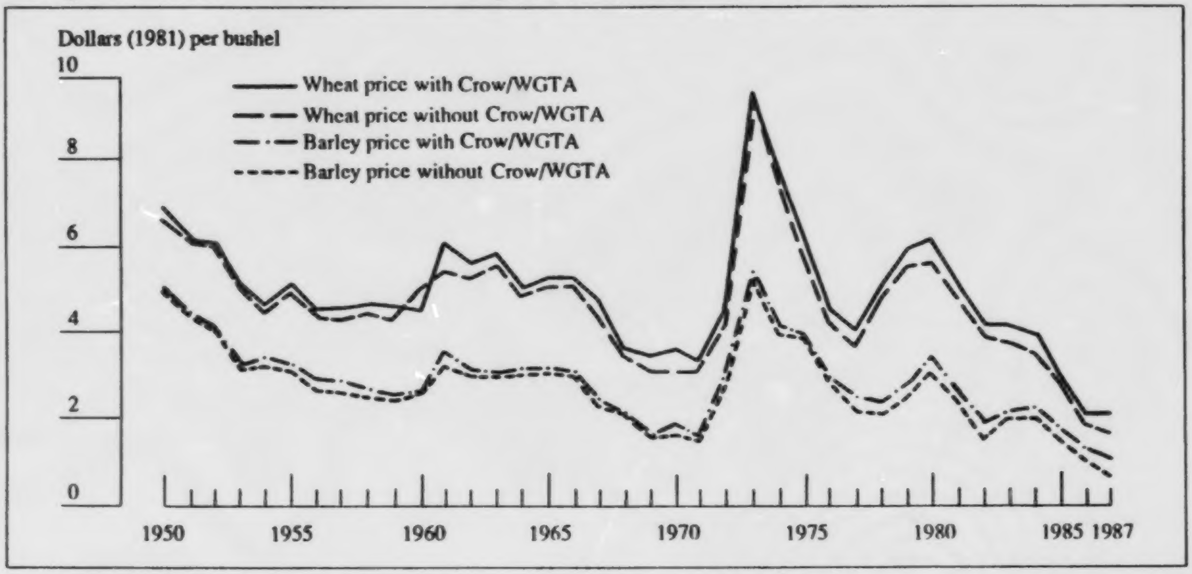
Chart 8-2 presents an estimate of the average real price of wheat and barley in the Prairies with the Crow/WGTA removed. It is evident from the chart that the difference in the price of wheat and barley that can be attributed to Crow is fairly small. Indeed, over the period 1950-87, the Crow/WGTA increased the price of those commodities by an average of 7 per cent. The drop in the price of the other commodities that would have occurred with the removal of the Crow is similar in percentage terms. Notice, however, that, since 1975, the price difference attributable to Crow has become more substantial. Over this period, the Crow has increased the average price of wheat and barley in the Prairies by approximately 10 per cent. Table 8-1 gives the real prices (in 1981 dollars) of wheat and barley, with and without Crow/WGTA, from 1975 to 1987.

The changing prices of the major commodities can be expected to have an effect on production. In calculating the change in production of a particular commodity, it is necessary to consider a direct effect and an indirect effect. The direct effect occurs when the price of the commodity itself changes; for example, a decrease in the price of wheat can be expected to reduce the production of wheat. The indirect effect, on the other hand, occurs when the price of other commodities change. In other words, a decrease in the price of barley or canola can be expected to lead to an increase in the production of wheat.

If Crow/WGTA were eliminated, the prices of all commodities could be expected to fall. In evaluating the production effect on a commodity like wheat, the price changes of all commodities, not just wheat, must be taken into account. That was done by utilizing the cross-price elasticities of supply.[8] Table 8-2 presents the short-run, own-price, and cross-price elasticities used in the analysis of this chapter.[9]

Chart 8-2

Average Farm Price of Prairie Wheat and Barley, With and Without Crow/WGTA, 1950-87



SOURCE Based on data from Statistics Canada.

Table 8-1

Real Price of Wheat and Barley, With and Without Crow/WGTA,[1] Prairie Provinces, 1975-87

	Price with Crow/WGTA		Price without Crow/WGTA	
	Wheat	Barley	Wheat	Barley
	(1981 dollars per bushel)			
1975	6.14	3.98	5.87	3.79
1976	4.52	2.99	4.32	2.84
1977	4.08	2.38	3.78	2.18
1978	5.15	2.36	4.81	2.17
1979	5.96	2.87	5.55	2.56
1980	6.18	3.39	5.78	3.19
1981	5.05	2.61	4.74	2.40
1982	4.25	1.91	3.96	1.68
1983	4.22	2.27	3.87	2.01
1984	3.98	2.29	3.52	2.01
1985	3.07	1.81	2.82	1.67
1986	2.27	1.32	1.86	1.03
1987	2.27	1.00	1.78	0.68

[1] Assistance under the *Western Grain Transportation Act*.
SOURCE Based on calculations by the authors.

The change in production would also depend on whether the time frame is the short run or the long run. In the short run (e.g., one year), the change in production from a change in price could be expected to be fairly small, since in that length of time it would be difficult to adjust the production process or to purchase the new equipment necessary to increase production. In the longer run (e.g, five years), however, those changes could more easily be made, with the result that the increase in production could be expected to be much larger. Table 8-3 presents the long-run, own-price supply elasticities used in this chapter.[10] On the basis of empirical estimates, they were calculated to be three times the short-run, own-price supply elasticities.[11]

Chart 8-3 graphs the actual production of wheat, the production that would occur in the short run if Crow/WGTA were removed, and the production that would occur in the long run. Since 1975, the average annual increase in the production of wheat and barley attributable to Crow/WGTA under long-run conditions has been 7 and 6 per cent, respectively. Similar changes in production would occur for the other major commodities grown in the Prairies. Table 8-4 presents the level of production of wheat and barley, with and without Crow/WGTA, for the period 1975-87.

The estimates of production response presented above were calculated on the assumption that the elasticity of supply would be constant over all prices. When the prices of grains and oilseeds are very low, as they were in the mid-1980s, the supply curve could be expected to become more elastic. In particular, during periods of low prices,

Table 8-2

Short-Run, Own-Price, and Cross-Price Supply Elasticities for Major Crops in the Prairie Region, 1985

	Production					
Price	Wheat	Oats	Barley	Rye	Flax	Canola
Wheat	0.4597	–0.1937	–0.1937	–0.1937	–0.1937	–0.1937
Oats	–0.0264	0.4251	–0.0264	–0.0264	–0.0264	–0.0264
Barley	–0.0564	–0.0564	0.3276	–0.0564	–0.0564	–0.0564
Rye	–0.0065	–0.0065	–0.0065	0.6174	–0.0065	–0.0065
Flax	–0.0089	–0.0089	–0.0089	–0.0089	0.3991	–0.0089
Canola	–0.0615	–0.0615	–0.0615	–0.0615	–0.0615	1.0269

SOURCE E. Krakar and B. Paddock, "A systems approach to estimating Prairie crop acreage," Working Paper 15/85, Agriculture Canada, Marketing and Economics Branch, 1985.

Table 8-3

Long-Run,[1] Own-Price Supply Elasticities for Major Crops in the Prairie Region, 1985

	Production[2]					
Price	Wheat	Oats	Barley	Rye	Flax	Canola
Wheat	1.3791	–	–	–	–	–
Oats	–	1.2753	–	–	–	–
Barley	–	–	0.9828	–	–	–
Rye	–	–	–	1.8522	–	–
Flax	–	–	–	–	1.1973	–
Canola	–	–	–	–	–	3.0807

1 Calculated to be three times the short-run elasticities in Table 8-2.
2 Dashes indicate zero elasticity.
SOURCE Based on calculations by the authors.

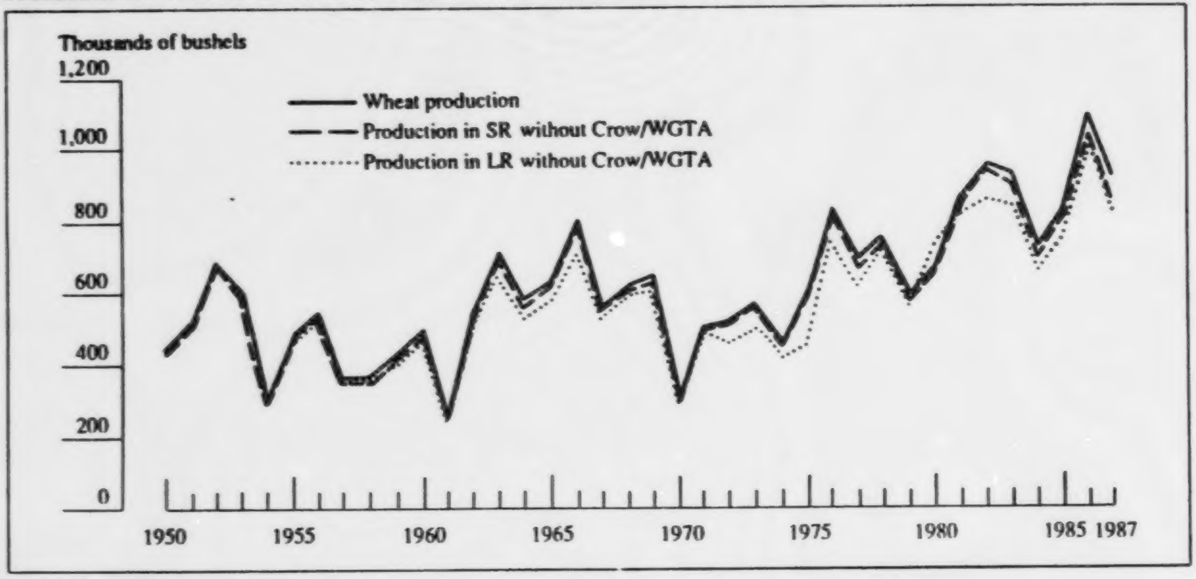
farmers might decide to reduce production substantially if they cannot earn a positive rate of return. In situations like that, programs that increase the price by even as much as 10 per cent could have a fairly large impact on production.

If such an outcome were to occur, it could actually prove beneficial to livestock producers, since it would ensure them a supply of feed (see discussion below). Livestock production would be reasonably profitable if feed prices were low, and it could be that a stable supply of feed would be as useful as a reduction in the price of barley. The degree to which Crow/WGTA has contributed to keeping production levels up during the period of low prices in the mid- and late 1980s cannot be determined without further analysis.

The change in the price of grains in the Prairies attributable to the Crow/WGTA could also be expected to have an impact on the livestock industry in other ways. Economic theory would suggest that the higher price resulting from those programs could be expected to make livestock production less profitable, thereby causing a reduction in output. Empirical studies that examined the supply of livestock through the early 1970s, however, failed to find evidence of such an effect. Instead, those studies argued that the major factor affecting the slaughter of cattle and hogs, outside of the animal's own price, was the stock of feed grain in the Prairie region. The reason for the importance of that variable had to do with the CWB quotas. If the latter were binding (as they often were during the years prior to the early 1970s), any grain in excess of those quotas would have a depressed value. Thus the extra stocks were a cheap source of feed for livestock.[12] The implication of this is that at least up until the early 1970s, the Crow would appear to have had little, if any, negative impact on the livestock sector. Indeed, if the Crow

Chart 8-3

Production of Wheat in the Prairies, With and Without Crow/WGTA, 1950-87



Source Based on data from Statistics Canada.

Table 8-4

Production of Wheat and Barley With and Without Crow/WGTA, Prairie Provinces, 1975-87

	Production with Crow/WGTA		Production without Crow/WGTA			
			In the short run		In the long run	
	Wheat	Barley	Wheat	Barley	Wheat	Barley
			(Millions of bushels)			
1975	600	404	591	402	468	363
1976	836	455	825	453	739	413
1977	692	515	674	510	625	483
1978	756	447	739	442	721	434
1979	598	357	585	351	560	340
1980	670	479	655	478	630	456
1981	875	580	857	574	823	552
1982	957	578	938	566	860	531
1983	930	418	904	410	845	384
1984	729	415	699	410	661	371
1985	825	502	800	500	750	472
1986	1,096	599	1,028	583	1,001	553
1987	926	578	861	547	840	511

Source Based on data from Statistics Canada, Cat. 21-516.

had had any effect, it would have been beneficial, since the Crow appears to have been responsible for a very small increase in production during that period.

The impact of Crow on the Prairie livestock industry since the early 1970s is more difficult to determine. No empirical studies are available to suggest whether stocks of feed grain still have an effect on livestock production or whether the price of feed grain (livestock production is expected to be inversely related to the price of feed grain) is now the more important variable. On the basis of the observation that CWB quotas were not binding during the late 1970s and early 1980s to the degree that they were in the years prior to the early 1970s, it could be expected that excess stocks of grain would no longer be available for livestock (for a discussion of the degree to which quotas have been binding over the years, see Chapter 9). In turn, that would suggest that the price of feed grain would influence the level of production of livestock.

While no empirical estimates of the elasticity of livestock output to feed-grain prices are available for the Prairie region, estimates are available for other regions of Canada and North America. Table 8-5 presents those estimates, along with the ones assumed for this study. On the basis of these elasticity estimates, the number of cattle and hogs that would have been slaughtered had the Crow/WGTA been removed were calculated (Charts 8-4 and 8-5). In the short run, the low cross-price elasticity implies that the slaughter of cattle and hogs was not affected to any great extent. In the long run, however, the supply response for cattle is somewhat greater, particularly for the late 1980s. During the period 1975-87, long-run cattle production is estimated to have been reduced by an average of approximately 6 per cent per year as a result of Crow/WGTA. According to the elasticities used in the analysis, hog production appears to have been less sensitive to the price of feed grain. Over the period 1975-87, average hog production is estimated to have fallen by 2 per cent per year as a result of Crow/WGTA.[13]

From an empirical perspective, resource allocation appears to have been influenced by the Crow/WGTA, although the effect appears to have been small, particularly for the period prior to the mid-1970s. Indeed, those programs have had much less effect on the price and supply of grains and oilseeds than have the year-to-year fluctuations that occur as a result of worldwide market conditions.[14] This suggests that while the Crow/WGTA is likely responsible for a shift of resources to grain production, the shift is unlikely to have been substantial.

One other point must be made with respect to resource allocation. The calculations undertaken above assumed that the world grain market is perfectly competitive and that the only distortion is the Crow/WGTA. That, of course, is not the case; as Chapter 2 pointed out, the world market has been significantly affected by government programs. From the point of view of resource allocation, an economic argument could be made that production subsidies in countries like Canada are appropriate when the world price is depressed as a result of the actions of other nations.

Table 8-5

Livestock Supply Elasticities with Respect to Feed-Grain Prices, Selected Regions, 1975-87

Production / Feed-grain price	Cattle	Hogs
Kulshreshtha		
(Eastern Canada)		
Short run	–0.32	..
Long run	–0.96	..
Meilke, Zwart, and Martin		
(Eastern Canada)		
Short run	..	–0.03
Long run	..	–0.12
Meilke, Zwart, and Martin		
(United States)		
Short run	..	–0.01
Long run	..	–0.03
Fulton, Rosaasen, and Schmitz		
(this study)		
Short run	–0.32	–0.12
Long run	–0.96	–0.36

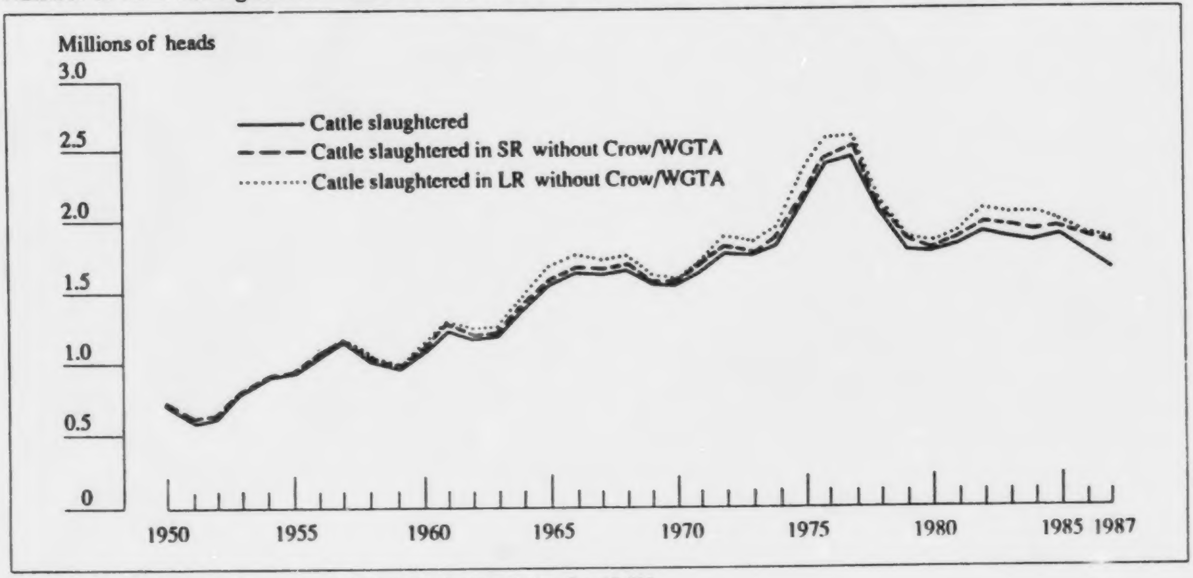
SOURCE K. D. Meilke, A. C. Zwart, and L. J. Martin, "North American hog supply: A comparison of geometric and polynomial distributed lag models," in *Canadian Journal of Agricultural Economics* 22, no. 2 (July 1974) pp. 15-30; and S. N. Kulshreshtha, "An analysis of the Canadian cattle supply using polynomial distributed lags," in *Canadian Journal of Agricultural Economics* 24, no. 2 (July 1976) pp. 1-14.

The rationale is that although the domestic policies of other countries have lowered the world price, Canada should nevertheless be producing according to what the market price would have been under free trade. The implication is that it might be appropriate to raise the price received by Canadian farmers above the depressed world price in order to achieve that outcome. Thus any impact that Crow/WGTA would have had during the mid-1980s might be seen as desirable if examined from that perspective. It should be noted that a similar argument could be used in analyzing a deficiency payment such as SCGP.

As mentioned in the introduction to this chapter, the analysis above focused on the impact of totally removing Crow/WGTA. What would have happened, however, had Crow/WGTA been retained and the method of payment been changed? It is interesting to note that the effect of that

Chart 8-4

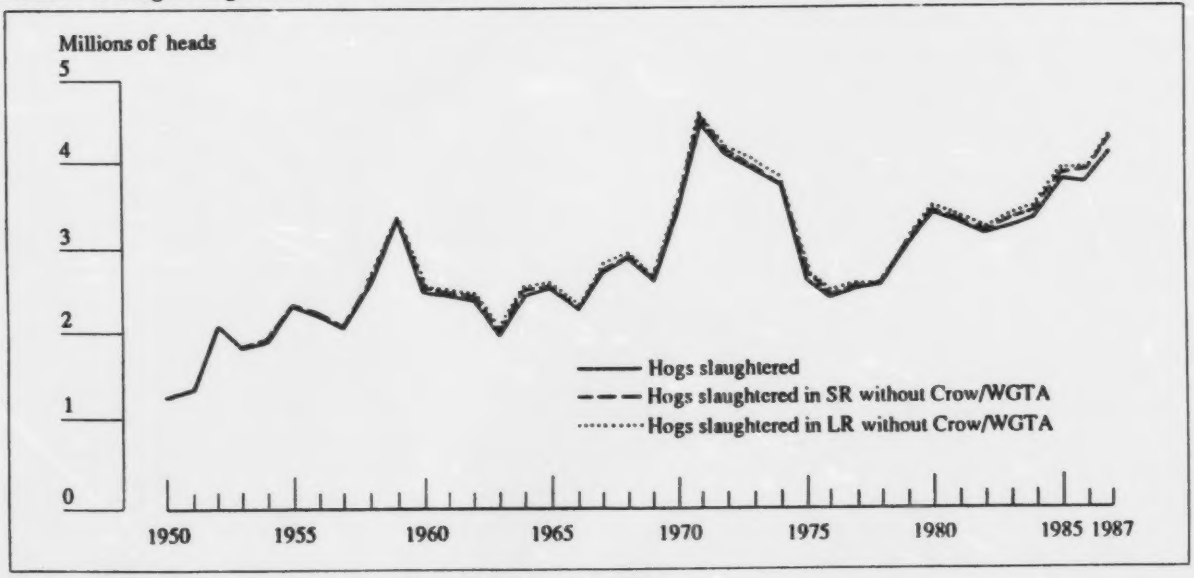
Number of Cattle Slaughtered in the Prairies, With and Without Crow/WGTA, 1950-87



SOURCE Statistics Canada, *Livestock and Animal Products Statistics*, Cat. 23-203.

Chart 8-5

Number of Hogs Slaughtered in the Prairies, With and Without Crow/WGTA, 1950-87



SOURCE Statistics Canada, *Livestock and Animal Products Statistics*, Cat. 23-203.

change would depend upon the variables being considered. Directly paying the producers instead of paying the railways would have had an effect on Prairie grain prices – and hence livestock production – that was very similar to that of removing Crow/WGTA altogether. Farmers would have been required to pay a higher freight rate, thereby lowering the price they would receive for their grain. The lower price would then have meant lower feed costs to livestock producers – much the same as if Crow/WGTA had been removed altogether.

Paying Crow/WGTA to producers instead of to the railways, however, might not have changed the level of crop production all that much. If the level of transfer received by farmers was dependent upon the amount of output they produced, it could be expected that farmers would behave in much the same fashion as when they received the subsidy via a lower freight rate. In other words, paying the producer directly would still have effectively raised the price that farmers receive for their grain. Assuming that farmers respond to higher prices in much the same fashion, regardless of how they are received, the level of production would be similar to what it would be if the Crow/WGTA were paid to the railways. On the other hand, if the payment of the Crow/WGTA to producers had not been linked to the level of output – i.e., if the payment was decoupled in some fashion – then the level of production could be expected to be closer to the estimates generated under the assumption that Crow/WGTA was completely removed.

Resource-allocation problems also exist between different modes of transportation. Paying the Crow Gap to the railways implies a subsidization of rail transportation, which in turn suggests that this mode of transportation will be used more extensively than others. On the other hand, paying the farmers could increase the degree to which alternative types of transportation, such as trucks, would be used. Which of these is more desirable will depend on the private and the social costs/benefits of those two methods of transportation.

International Arena

Crow/WGTA has received the attention of a number of Canada's trading partners, with the focus being on at least two aspects of the program: 1) the higher price that the subsidy implies may increase Canadian production, thus implying a loss of market share for the other competitors; and 2) the subsidy itself means that Canadian farmers are able to sell grain on international markets at prices lower than they would otherwise be.

The data presented above would suggest that both of these concerns appear to be generally unfounded, particularly for the period prior to 1975. First, the inelastic-supply curve for grains and oilseeds suggests that any price increase resulting from Crow/WGTA would not cause any substantial increase in production in the short run. Second, the effect of Crow/WGTA on grain prices has generally been small, suggesting that the long-run production effect would not be substantial either. It also implies that Canada's ability to charge lower prices on the international market would also be limited. That may be less true for the period since 1975, however, during which time Crow/WGTA is estimated to have increased the price of wheat in the Prairie region by approximately 10 per cent. Finally, if Crow/WGTA resulted in transportation bottlenecks, which in turn made marketing quotas more binding, then production could actually be reduced during the time period in which those constraints were present.[15]

Regardless of the actual impact of Crow/WGTA on price and production, this program is highly visible at the international level. In particular, because it means that farmers receive a higher price for the grain they export, it is precisely the type of program that negotiators at GATT believe is trade-distorting. Even if the method of payment were changed so that farmers received the transfer directly, WGTA would still be considered trade-distorting if the amount of the transfer they received was dependent upon the amount of output they produced. On the other hand, a method of payment that would effectively decouple the payment and output would not be considered trade-distorting under the GATT rules.

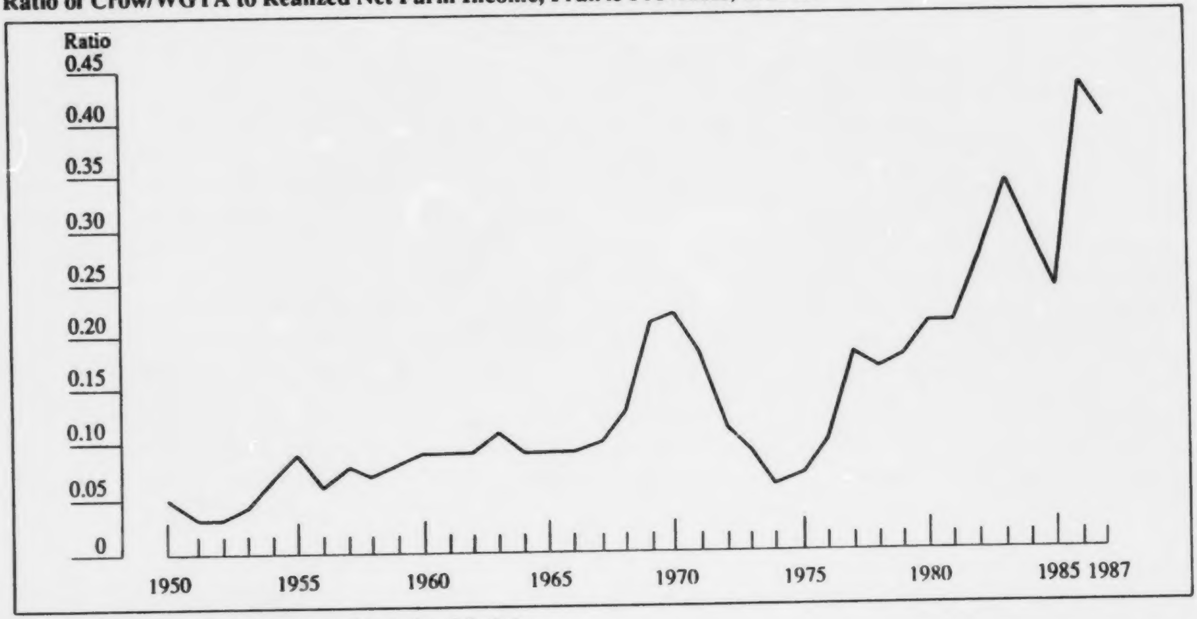
In summary, Canada will be under a great deal of pressure at the GATT negotiations to change, or eliminate, WGTA. Of course, other major grain producers, such as the United States and the EC, also support their transportation networks through such things as underwriting the cost of water transportation on the Mississippi or the Rhine. Those programs should also come under scrutiny at the GATT negotiations.

Farm Income

Chart 8-6 illustrates the degree to which Crow/WGTA has increased the income levels of Prairie farmers. While the impact of the Crow Rate on the price and production of grain appears to be relatively small, the change in the level of realized net farm income received by farmers is significantly greater. (The sensitivity of farm income to changes in price was also discussed in Chapter 3.) Over the period 1950-85, payments under Crow/WGTA averaged just under 15 per cent of income. The importance of that program, however, in terms of its contribution to income has been increasing over the years. By the early 1980s, Crow/WGTA constituted approximately 25 to 30 per cent of realized net farm income,

Chart 8-6

Ratio of Crow/WGTA to Realized Net Farm Income, Prairie Provinces, 1950-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

reaching nearly 40 per cent in 1986 and 1987. Extreme caution is needed in interpreting that number, however. As will be seen in Chapter 9, realized net farm income in the absence of government programs would be negative – implying that, taken together, all programs constitute more than 100 per cent of positive net farm income.

Although the absence of Crow/WGTA might have lowered incomes to farmers, not all farmers would necessarily have experienced a loss as great as that illustrated above. As will be seen in the next section, if Crow/WGTA had not been in place, it is expected that farmers entering the industry or expanding their operations in the 1970s and 1980s would have paid a lower price for land. The reduced debt charges that would have resulted from that lower price have not been taken into account in the estimates presented in Chart 8-6. Thus in the absence of Crow/WGTA, the actual income received by the new entrants could have been higher than what is illustrated.

That does not mean that if Crow/WGTA had been removed in 1987, the impact would have been smaller than estimated. In fact, if WGTA were to be removed without any compensation, farmers would lose in two ways. First, net farm income from grain farming would drop by approximately 40 per cent, since transportation costs would rise. Second, as will be seen below, the price of land would fall. In short, the impact of removing a program like Crow/WGTA would depend upon the state of the industry at the time the change was made. The removal of Crow/WGTA during periods of low prices would be especially harmful.

A change in the method of payment, provided that total transfers to Prairie farmers remained the same, would not have had much of an impact on the income of farmers. In other words, retaining the Crow but paying it to producers instead would have kept income relatively unchanged from its historical level.

Income Distribution

As mentioned above, WGTA provides a fixed subsidy per tonne of grain moved to export position. Thus the benefits of WGTA can be expected to be directly proportional to the amount of grain that a producer ships, suggesting that the larger producers will benefit the most.

If WGTA has had the effect of raising the price of land, then the distributional question is more complicated. Are large producers affected to a greater extent because they have to purchase a larger amount of land? Or are the smaller producers affected more because land represents a larger proportion of their costs? While no empirical work has been undertaken on this subject, it is likely that higher-priced land would have a greater impact on small farmers than on large ones.[16]

Land-Price Fluctuations

To the extent that Crow/WGTA has raised farmers' incomes, however, it is also likely to have increased their costs – particularly the cost of land. If that is the case, then the real beneficiaries are those farmers who started farming at a point in time when the Crow was not a significant subsidy. Farmers since that time have had to pay a higher price for land in order to get access to that subsidy and thus have not benefited greatly from the program. If WGTA were to be removed in the future, the result would be not only lower incomes but lower prices for land and other assets. Farmers who purchased land prior to that point would lose in two ways. Not only would they have lower incomes, but the land they own would be of less value.

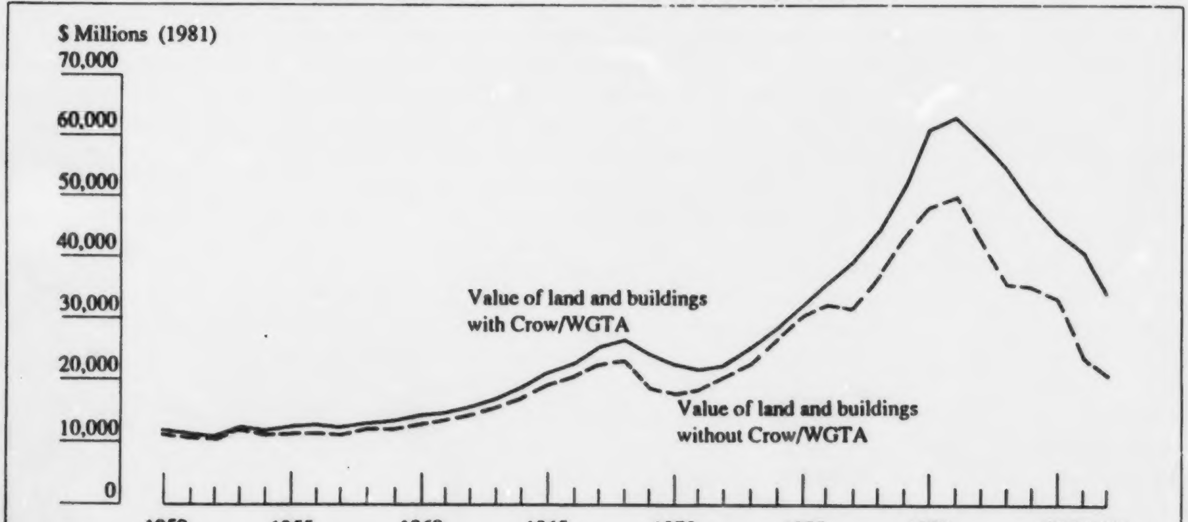
Chart 8-7 illustrates the actual price of land for the period 1950-87 and the price that could have been expected if Crow/WGTA had not existed. In calculating the latter series of land-price values, it was assumed that the ratio of farm-asset values to realized net farm income remained unchanged from that depicted in Chart 8-8. That, in turn, assumes that the absence of the Crow would not have had any impact on farmers' expectations about the returns they would get from farming other than to reduce the overall level of those returns. That point will be examined further in the next chapter.

As would be expected from an analysis of the impact of Crow/WGTA on realized net farm income, the Crow appears not to have had any major impact on the price of land and buildings in the Prairies if only the time period prior to 1975 is considered. Since 1975, however, the effect of Crow/WGTA has been more important, for two reasons. First, it was in this period that the Crow became a substantial contributor to realized net farm income (Chart 8-6). As a result, it would also be expected to have a corresponding impact on the value of land or buildings. In addition, however, it was in this period that the ratio of the value of farmland to realized net farm income increased (Chart 8-8). That, in turn, magnified the importance of Crow/WGTA's contribution to realized net farm income.

While the existence of the Crow/WGTA appears to have contributed somewhat to the increase in land prices that occurred in the late 1970s and early 1980s, Chart 8-7 clearly indicates that even in the absence of the Crow/WGTA, land

Chart 8-7

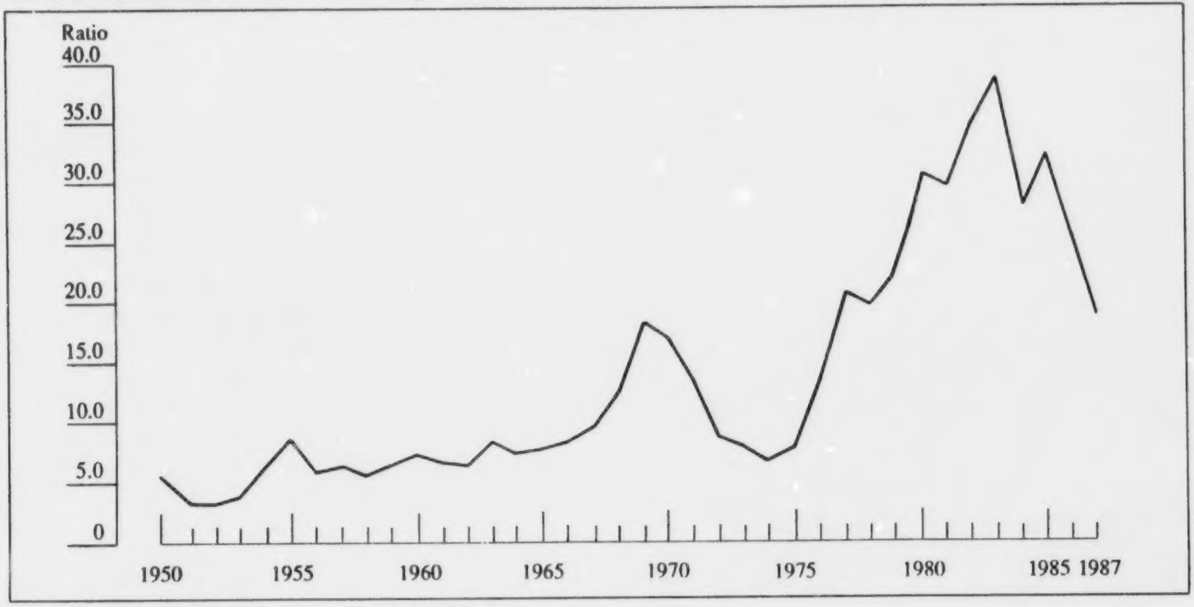
Value of Prairie Farmland and Buildings, With and Without Crow/WGTA, 1950-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 8-8

Ratio of Value of Farmland and Buildings to Realized Net Farm Income, Prairie Provinces, 1950-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics.*

prices would still have fluctuated dramatically. In other words, even if Crow/WGTA had been completely capitalized into land values, it would not have been responsible for the sharp rise in land values in the 1970s. In addition, while the presence of the Crow did push land prices higher than they would have been otherwise, the Crow has also stopped land and building values from falling as far as they might have in the period since 1981.

Overall, it would appear that Crow/WGTA has not had a major impact on the fluctuations that have occurred in land values. Indeed, that is a direct result of the way in which the land-price series without Crow/WGTA was constructed. By assuming that the ratio of land values to income did not change from its historical pattern, the assumption is being made that Crow/WGTA had no effect on that financial variable. Chapter 9 presents an argument as to why programs like Crow/WGTA would have had little impact on that ratio.

Economic Spinoffs

To the extent that Crow/WGTA has increased the production of grains and oilseeds in the Prairies, fertilizer and chemical companies, machinery dealers, and the grain-handling and transportation firms will all have benefited from the program. In fact, the average increase in production of 6 or 7 per cent attributable to Crow/WGTA since 1975 would result in an increase in input use of about 14 per cent.[17]

Western Grain Stabilization Act

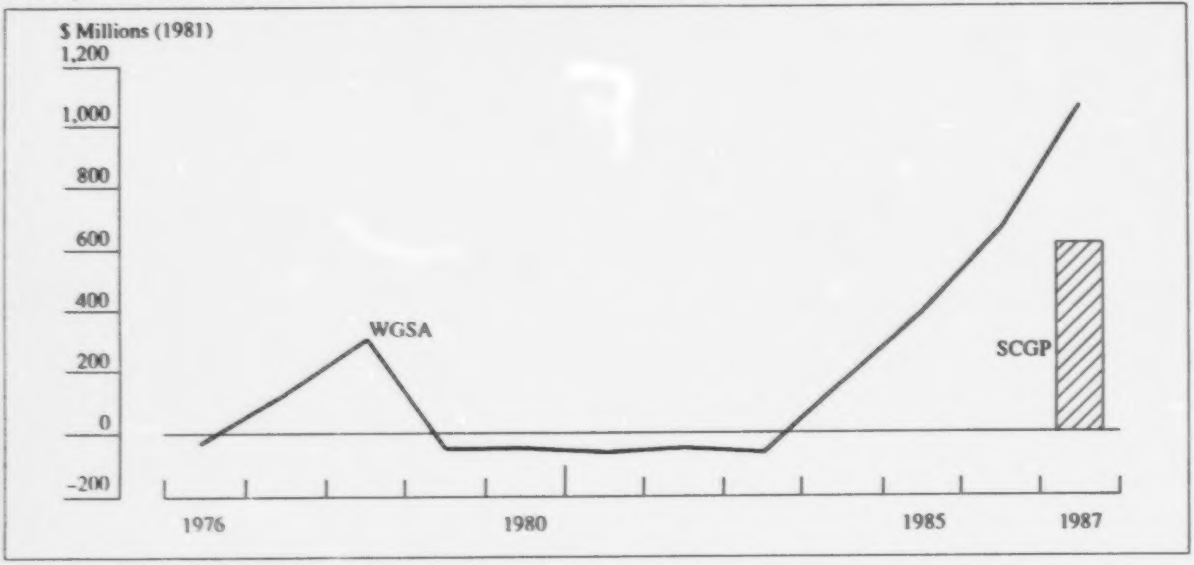
Chart 8-9 illustrates the net payments to Prairie producers under WGSA since its inception in 1976. Downturns in the agricultural industry in 1977/78 led to payouts under the program early in its existence. That was followed by five years in which no payments were made: net payments to participating farmers were negative, reflecting the levies they paid to the stabilization plan. Since 1984, payments have once again been made under WGSA. The steady escalation of net payments over the past four years made WGSA the largest source of payments received by farmers from government policies in 1987 (see Chart 7-1).

Resource Allocation

The economic impact of WGSA in the Prairie region depends upon whether agriculture is experiencing good or bad times. During prosperous periods, WGSA has the effect of making noneligible crops more profitable, since the levy that must be paid on eligible crops effectively reduces their

Chart 8-9

Net Payments to Prairie Producers under WGSA and SCGP, 1976-87



SOURCE Based on various sources of information.

price. From a theoretical point of view, however, the impact of that relative price change on production is likely to be very small. The small reduction in price caused by the levy is unlikely to make the noneligible crops sufficiently profitable to entice farmers to shift large amounts of resources to them. In addition, the levy only represents a price reduction for those farmers who have gross receipts of less than the $60,000 maximum.[18] During periods of high prices, the proportion of production in the Prairies attributable to farmers who have reached the maximum levy will increase, resulting in this production being unaffected by the levy.[19]

The impact of WGSA may be much greater when price is low or is falling rapidly. During such periods, a payout from the program is likely. For each farmer, the level of payout is determined by multiplying the total value of the payout by his or her share of it. Since a farmer's share is based on the current and past levels of his or her levy, it would pay to increase the levy – by increasing the acreage and yield of eligible crops – in order to increase the payment received. That will only occur, however, if the farmer is below the maximum levy of $60,000. When crop prices are low, the number of acres that a farmer can seed and still remain under the maximum will increase. As a result, it can be expected, from a theoretical point of view, that during downturns in prices, production of eligible crops will increase, while production of noneligible crops will decrease.

While it is certainly beneficial for farmers to increase their acreage (and/or yield) of the eligible crops in order to be eligible for greater payouts, there may be a cost to such a strategy. More specifically, farmers wishing to increase production will have to alter their crop rotation – for instance, seed more stubble – which could impose a cost on them in the future in the form of lower yields. If that cost was high enough, as it is in a number of areas in the Prairies (e.g., southwestern Saskatchewan and southern Alberta), farmers would not make the change. In summary, if a farmer is below the maximum levy, then in the short run, returns can be increased by allocating more acreage to the eligible crops. In the longer run, however, such a strategy might be costly because it would have the effect of reducing yields in the future.

From an empirical point of view, it is difficult to determine whether WGSA has had the effects that theory would suggest. Chart 4-6 showed the acreage seeded to the six principal crops for Manitoba, Saskatchewan, and Alberta. Acreage, rather than actual production, provides a better indication of the decisions being made by farmers, since it does not depend upon yields, which can fluctuate highly because of weather. Over the last 60 years, there has been an upward trend in the acreage seeded to wheat, oats, barley, rye, flax, and canola – a trend that appears to have accelerated since the early 1970s.

The upward trend in acreage has resulted in an upward trend in production (see Chart 4-7). During the same time period, however, the real price of wheat received by Prairie farmers has generally been trending downward (see Chart 1-1). It should be noted that while real prices were falling during the period 1979-83, current-dollar prices were relatively constant. When that is combined with increasing production (implying increasing total revenue), the result is that payouts under WGSA were not triggered.

On the basis of the discussion above, WGSA should have had little impact on the decisions that farmers made with respect to the acreage they planted in the period 1979-83. If that is the case, then it would appear that the trend in production unaffected by WGSA is upward, even with falling real prices. That upward trend appears to have continued since 1983 – the time period in which payouts under WGSA were being made. One way to interpret that is to say that WGSA has had little effect on production: production and acreage are simply following the same trend as when payouts were not being made. On the other hand, it is possible that the sharp drop in price that resulted in payments under WGSA would have actually led to reduced production in the absence of WGSA.

Which is the more appropriate explanation? To answer that, it is perhaps useful to examine how acreage and output could be trending upward when real prices are falling. While that would appear to imply a downward-sloping supply curve (i.e., a lower price and increased output), alternative explanations are possible. Recall from the discussion of Crow/WGTA that empirical estimates suggest that the supply curves for grains and oilseeds in the Prairies are very inelastic in the short run, which implies that for any given period of time, changes in price will not lead to changes in output. How can that be reconciled, however, with the notion that, over time, output is actually increasing?

One answer is to assume that, over time, the inelastic supply curve is shifting outward. One of the major reasons for this shift is changes in technology. As Schultz and Cochrane point out, technology change in agriculture is one of the major factors determining the supply of agricultural products.[20] There is considerable evidence that technological change is a major factor in the Prairies. As was noted in Chapter 4, use of fertilizer and pesticides has increased dramatically since the early 1970s (see Charts 4-2 and 4-3). That suggests a movement towards practices such as continuous cropping, which involve a greater use of inputs. Acreage devoted to summer fallow in the Prairie region experienced a steady decline from 25.7 million acres in 1979 to 18.9 million acres in 1986,[21] lending support to the notion that changes in technology, such as continuous cropping, are occurring in the Prairies.[22]

Did WGSA have any impact on the rate at which technology was adopted? It is argued by some authors that a reduction of risk can lead to shifts in the supply curve.[23] Thus if WGSA reduced the risk that farmers were facing, then they might have been encouraged to specialize in, and increase, the production of those crops which are made less risky. While the precise impact of WGSA is impossible to determine one way or the other without much further research, it would appear that WGSA has not been a major factor in increasing agricultural output in the Prairies.

That conclusion is derived from the fact that the adoption of technology and the increase in production continued during the period when wheat prices were falling in real terms and when the impact of WGSA could be expected to be minimal. In addition, other factors seem to provide a better explanation of why technology was adopted. As will be seen in Chapter 9, the adoption of output-increasing technology is consistent with the expectations that farmers had regarding prices during the 1970s and 1980s, as well as the changes that occurred in Canada's position in the world grain market. Thus the evidence suggests that factors other than WGSA played the major role in the adoption of technology in the Prairies. As a result, the overall impact of WGSA would appear to be relatively resource-neutral.[24]

These results are supported by other research that has been undertaken. In a study of WGSA, Cameron concludes that WGSA appears to have had relatively little effect on resource allocation.[25] It is interesting to note that those results were obtained despite the fact that Cameron does not account for the possibility of any changes in technology occurring as a result of factors outside the system. In the study, any increases in acreage that have occurred since WGSA was implemented and cannot be explained by price were attributed to the presence of WGSA.[26] The discussion above suggests that this is unlikely to have been the case. Other factors such as overoptimistic price expectations and a change in Canada's role in the international market, also appear to have played a part. As a result, the estimates of Cameron might be seen as upper bounds to the impact of WGSA.

International Arena

If, as argued above, WGSA has not led to any major increases in output during the 1980s, then the program itself should be relatively free from international criticism. In practical terms, however, unless the relationship between programs like WGSA and changes in technology are well understood, there is likely to be continued concern from the international community regarding such programs. The increased level of production that has occurred during the 1980s as a result of technological change is certainly not the most appropriate response to the weak markets that have also characterized this period: one of the reasons for the weak market is excess production in the world grain and oilseed markets. A much greater understanding of the role played by technological change is required in order to sort out these effects.

WGSA does send a signal to other players in the international grain and oilseed markets that Canada will protect its farmers when prices are lowered – an important element to consider in the game playing that goes on in the international trade community. As well, WGSA does not encourage production when prices are normal or above normal, suggesting that programs like WGSA should not be viewed as having contributed to an expansion of Canada's output when markets were relatively strong.

Farm Income

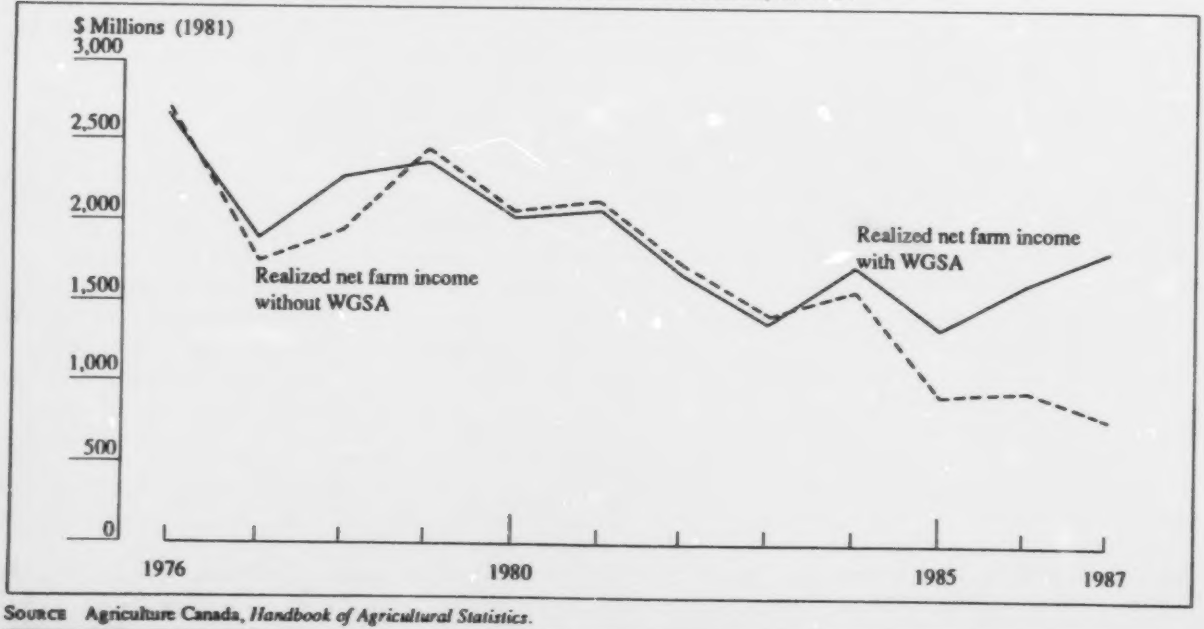
Chart 8-10 presents realized net farm income for the Prairies, with and without WGSA. With WGSA in place, realized net farm income in 1977 and 1978 was somewhat higher than it would have been in the absence of the program. The payment of WGSA levies by producers during the period 1979-83 lowered realized net farm income from what it would have been otherwise. Since 1983, the existence of WGSA has raised income substantially. In fact, WGSA had the effect of raising the level of realized net income by 29 per cent, 40 per cent, and 56 per cent in 1985, 1986, and 1987, respectively. The result is that WGSA contributed to a much more stable level of total income than would have prevailed otherwise.

While WGSA has stabilized the total net income of Prairie producers, the income of individual farmers may not have been stabilized. One reason is that not all producers joined the program; when it was introduced in 1976, only 76.8 per cent of farmers joined it. That percentage fell somewhat over the next two years and then began to increase. The participation ratio in the 1986/87 crop year was 82.5 per cent.[27] Another reason that the incomes of individual producers may not be stabilized relates to the regional nature of the program and is examined in the next section.

The numbers in Chart 8-10 indicate that over the last 12 years, WGSA has paid out substantially more money to producers than they have paid in levies. As a result, the incomes of Prairie farmers have not only been stabilized;

Chart 8-10

Realized Net Farm Income, With and Without WGSA, Prairie Provinces, 1976-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

they have been augmented through the transfer of federal government funds. That, of course, was expected to occur to some degree, since the program was designed so that the federal government would more than match the contributions made by farmers. Indeed, in order to get producers to join, it was felt that the program would have to offer more than just stabilization. Otherwise, farmers could be expected to do just as well if they insured their operations themselves.[28]

The large payouts that have occurred in the past four years, however, have resulted in the stabilization fund incurring a substantial deficit. The federal government announced in December 1987 that $750 million of that deficit would be written off, implying that this portion would not have to be repaid. Nevertheless, the government is not viewing the entire deficit as a payment to farmers. The recently announced increases in producer levies under the program imply that the incomes of farmers will be reduced in the future in order to pay off the deficit.

That, in fact, is an important aspect to remember. While the numbers presented in Chart 8-9 show the transfers made to Prairie farmers, they do not indicate the subsidy that farmers are receiving. Since farmers will have to account for their portion of the deficit in future years, only the amount contributed by government should be designated as a subsidy. In short, WGSA has enabled producers to borrow money from the government – money that will have to be paid back when the market strengthens.[29]

Income Distribution

Like any program that bases participation on the size of the farming operation, WGSA can be expected to provide greater benefits to those farmers with the larger farms. As McCreary illustrates, programs structured in that manner could be expected to increase income inequality in western Canadian agriculture.[30] The impact of WGSA, however, is not expected to be large, since the ceiling of $60,000 in levies in any one year effectively caps the amount that a farmer can obtain from the program.

While the WGSA has contributed to the stabilization of the regional macroeconomic environment of western Canada, it is not necessarily the case that individual farmers' incomes have been stabilized. As the Canada West Foundation Special Task Force Report noted, it is possible that a small number of individual farmers could see their incomes fall dramatically because of, for example, poor weather conditions, while the income of the western grain-growing region remained relatively constant, thereby resulting in no payout.[31]

Land-Price Fluctuations

While the purpose of WGSA was to stabilize agricultural income in the Prairie region, this program could also be expected to have an impact on the price of land and other assets. The impact could occur through one of two ways: 1) through the trigger mechanism used to calculate payouts under WGSA; or 2) through the level of income received by farmers as a result of the program.

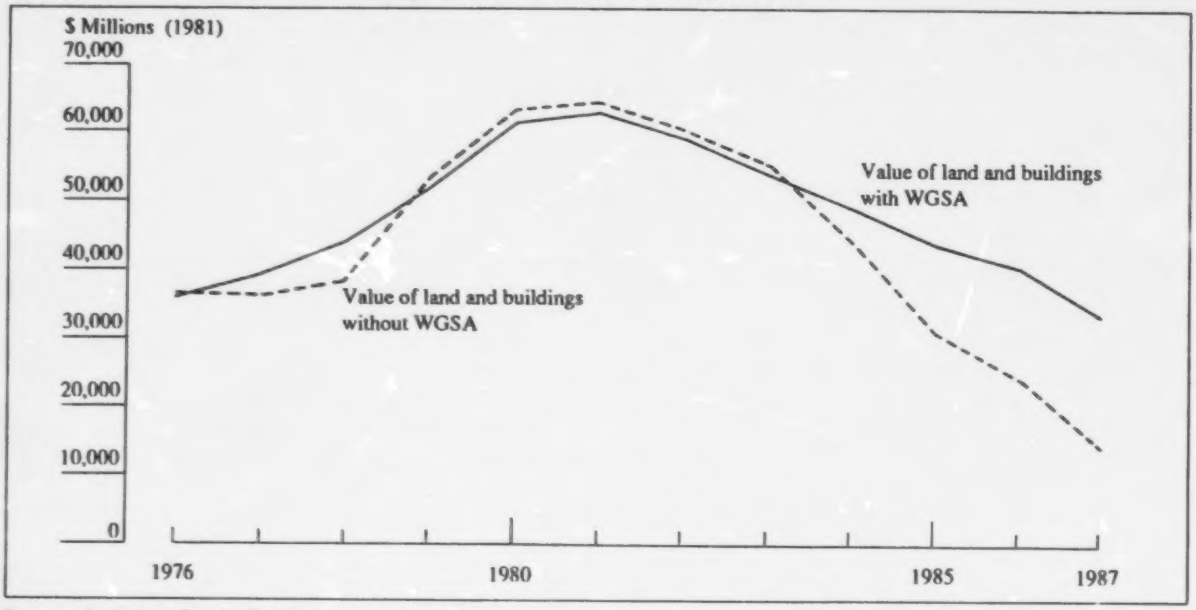
In calculating the net cash flow on which WGSA payments are based, interest on indebtedness is excluded. That has a number of effects. First, changes in interest rates, which can have a substantial effect on the net farm income of farmers, will not trigger a change in the payouts of the program. Second, as pointed out in Chapter 5, decreases in agricultural prices are expected to lead to decreases in land prices; however, the interest payments on the formerly high-priced land must continue to be made. Since these interest payments are excluded from the WGSA calculation, the net cash flow used in the calculation of payouts will show less volatility than the net income of farmers, thereby reducing the effectiveness of the WGSA in stabilizing the income of farmers.

While that particular provision of WGSA could be beneficial in controlling the fluctuation in land prices (the knowledge that interest on debt is excluded from the payment calculations should make farmers more aware of the price they are paying for land), it is unlikely to have much of an impact. Since payouts are based on the cash flow of the entire western region, an individual farmer will perceive his or her actions as having no impact on the total value of the payout. Thus producers are likely to behave in the same manner regardless of whether interest on debt is or is not included in the payout calculations.

The estimated effect of WGSA on the value of farmland and buildings as a result of its impact on income is illustrated in Chart 8-11. In calculating the numbers for the graph, realized net farm income without WGSA, presented in Chart 8-10, is multiplied by the ratio of the actual value of farmland and buildings to actual realized net farm income (see Chart 8-8). As can be seen, WGSA appears to have contributed substantially to the stabilization of capital values in agriculture. Since producer levies to the stabilization fund are more than matched by the federal government (and given the debt write-down undertaken by the federal government), WGSA has also resulted in land values being supported at a level that, on average, is higher than would otherwise be the case.

Chart 8-11

Value of Prairie Farmland and Buildings, With and Without WGSA, 1976-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

The conclusion that WGSA has led to a substantial support of land values must be questioned, however. Chart 8-10 illustrated that as a result of programs like WGSA, the actual realized net farm income in real terms has remained relatively constant since 1982. As Chart 8-11 indicates, however, the value of farmland and buildings has fallen considerably in real terms over that same period. If, as theory would suggest, agricultural-asset values are determined on the basis of the level of income in farming, then such a large drop in land values would not have been expected to occur.

The fact that asset values have fallen, however, may suggest that farmers are discounting the income received from agricultural programs.[32] In other words, the decline experienced in the actual value of farmland and buildings may reflect a belief among farmers that government payments are transitory. The implication is that even without WGSA, land values would have behaved in a similar manner. (For a fuller discussion of the relationships between realized net farm income and the value of farmland and buildings, see Chapters 5 and 9.) One of the possibilities, then, is that programs like WGSA may do little to stabilize land values. On the upside, WGSA does little to reduce land values; on the downside, if the value of WGSA payments is discounted, the program may be unable to support land values. The degree to which that has been the case must be more fully explored.

Economic Spinoffs

As mentioned above, WGSA is a regional stabilization program. As such, it provides a much more stable level of agricultural income to the western provinces than would otherwise exist. This stabilizing feature is particularly important to input suppliers, since what they are concerned about is the financial health of all of their customers, not just certain individuals. Suppliers of other supplies and services to the agricultural and non-agricultural community also benefit from the extra economic activity generated during what would otherwise be a greater economic downturn.

It is important to realize that if WGSA has had little impact on the level of production in the Prairies, then sales of fertilizer and farm chemicals would not be expected to differ much from what they would otherwise be. On the other hand, suppliers of farm machinery and other capital items, as well as local suppliers of such things as cars and house furnishings, may see a difference in their sales as a result of WGSA. The reason is that WGSA does provide farmers with a greater and more stable level of income with which to purchase such items.

Special Canadian Grains Program

Chart 8-9 showed the payments to Prairie agricultural producers under the SCGP in 1986 and 1987. As Chart 7-1 indicated, the value of SCGP in 1987 was approximately that of WGTA, although it was somewhat lower than that of the net payments made under WGSA. Thus in terms of total outlays by government, SCGP is one of the more important agricultural policies in Canada.

Resource Allocation

The SCGP had no effect on the level of production of grains and oilseeds in 1986. Although there was much discussion and lobbying for a deficiency payment in the spring of that year, the program was not announced until December.

The SCGP may have had an impact on the acreage seeded in the spring of 1987. Although no follow-up to the SCGP was announced prior to seeding, the expectation was that a similar program would be put in place. Since the payout mechanism of the 1986 SCGP was based on seeded acreage, it is possible that some farmers seeded additional acres the following year to ensure that they would qualify for as large a payout as possible.

That practice was encouraged by the fact that large amounts of rainfall in the fall of 1986 provided better-than-adequate moisture conditions for the next spring and that many farmers had empty bins. This gave farmers the freedom to plant additional acres. Since SCGP in that year applied only to wheat, barley, oats, rye, mixed grains, corn, soybeans, canola, flax, and sunflower seeds, farmers may also have shifted their production away from specialty crops (e.g., field peas and lentils) and back to the traditional grains and oilseeds, since they believed that by doing so they would be eligible for a deficiency payment. All of these strategies, however, involve farmers altering their crop rotations – a practice that could prove to be costly in the future. Thus, from a theoretical perspective, the impact of SCGP on resource use is somewhat uncertain.

From an empirical perspective, it is also difficult to determine precisely what impact SCGP has had on resource use. Chart 4-6 indicated that acreage seeded to the principal crops in the Prairies declined in 1987. One interpretation would conclude that in the absence of SCGP, seeded acreage would have declined even further – i.e., that SCGP caused farmers to increase their production of the principal crops. More realistically, however, if the observation that seeded acreage declined is combined with the belief that the appropriate model for analyzing the supply of grains and oilseeds in the Prairies is one in which the supply curve is highly inelastic and shifts out over time because of technology adoption, then it should be concluded that SCGP had little impact on resource use in 1987.

The impact of SCGP on future resource-allocation decisions is uncertain. One of the main reasons is that the future of the program itself is uncertain. Since many farmers expect the program to be removed when prices strengthen, it may be that they will not change their cropping rotations just to take advantage of the program for one or two years. The expansion in the number of crops eligible under the SCGP announced in December 1987 should help to eliminate problems with farmers shifting their production into wheat and oilseeds just so they can be eligible for the deficiency payment. On the other hand, the change in the acreage base on which payments are calculated from 1986 to 1987 confirms the expectations of those farmers who believed that payments under the program would be related to current production.

By itself, this element of the program would suggest that in future years farmers will expand their production in order to be eligible for larger program payments, should the program remain in effect. The inclusion of summer fallow in the acreage base will discourage that practice, however, since farmers will still be able to participate in the program without having to grow a crop (one acre of summer fallow being counted as one-third of an acre of crop). Whether the weightings for summer fallow and seeded acreage are in the correct proportions to encourage farmers to make what would otherwise be "normal" seeding decisions can only be determined empirically.

As Appendix C points out, a properly designed deficiency payment for a country like Canada could be relatively costless in terms of net welfare costs to society. To keep those costs as low as possible, the key feature of a deficiency payment must be that it will not increase output. Output expansion can occur when the program either effectively raises the price of qualifying crops and/or fails to cover all potential crops. Even if price is raised, however, the program will only involve welfare costs if the elasticity of supply is fairly large. As noted above, the short-run supply elasticities for the major crops in the Prairies have been estimated to be quite small, implying relatively small welfare effects for a deficiency payment like SCGP that is not intended to be a permanent fixture of Canadian agricultural policy.

International Arena

While the welfare costs and output effects of a deficiency payment may not be large, programs such as the SCGP can have an impact on the international market. In particular, they send a signal to the other players in the international market about the type of role or strategy that Canada is prepared to undertake. For instance, such programs clearly indicate that Canada is not about to sit back and let other countries drive it out of the international market. In other words, it provides a "we'll fight" signal – a message that may be necessary if the other countries are ever going to be forced to sit down and negotiate an end to the crisis facing international agriculture.

If the program also leads to an increase in production, then it may send a signal to the other exporting countries that Canada is part of the problem and is not prepared to do anything to solve it. It may be extremely dangerous for Canada to present that view at a time when it is attempting to argue that the reason for the weak market is that other countries are subsidizing their farmers and encouraging excess production. While the empirical evidence suggests that this has not been happening, Canada must continue to ensure that its policies are as resource-neutral as possible.

Farm Income

The deficiency payment has had a major impact on the incomes of many farmers in the Prairies. For instance, current dollar realized net farm income for 1987 was estimated to equal $555.5 million, $1,000.2 million, and $822.7 million in Manitoba, Saskatchewan, and Alberta, respectively. That represents a total of $2,378.4 million, of which approximately $900 million was from SCGP. Chart 8-12 illustrates the impact of SCGP on realized net farm income, measured in constant 1981 dollars.

While the deficiency payment was not introduced to address the debt problem, it nevertheless had an impact. Consider, again, the example of the farmer who initially owned 640 acres of land and who purchased an additional 320 acres in 1980 at a price of $1,000 per acre. If the farmer planted 640 acres of wheat, his or her gross income for the 1986/87 crop year would have been approximately $60,000. With operating expenses of $32,000, net income before land payments, equipment, and a management and living allowance would have been roughly $28,000.[33]

Clearly, that level of income is insufficient to meet land payments of $36,700, let alone provide the farm family with living expenses. Nor does the deficiency payment offer much assistance. Based on the acreage above, the farmer would have received approximately $9,000 from the SCGP,[34] leaving the farm family still unable to make its debt payments. Thus while the deficiency payment provides additional income to all farmers, it does not solve the problem of farmers who expanded during the late 1970s and early 1980s, when land prices were high.

Income Distribution

In general, a deficiency-payment program, if not capped, could be expected to increase the inequality of income within agriculture, when compared with other agricultural programs.[35] The SCGP is capped, with no producer being able to receive a payment of more than $25,000.

Land-Price Fluctuations

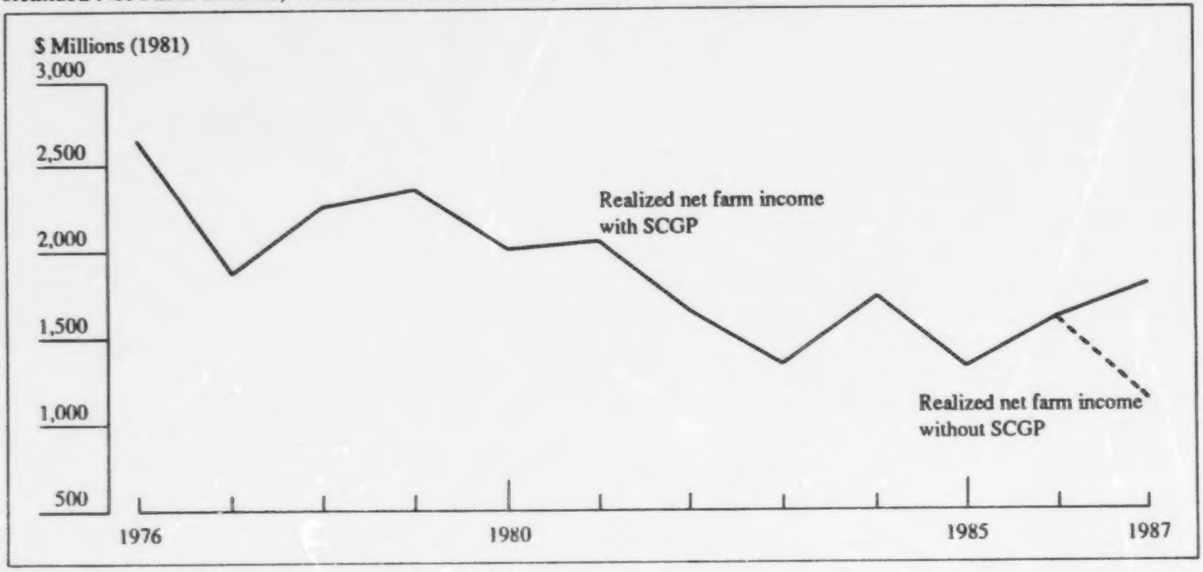
The impact of a deficiency-payment program on land prices is dependent upon a number of factors. For instance, at the time the program is introduced, an immediate effect would almost certainly be to slow the slide of land values. Chart 8-13 shows the value of farmland and buildings that could be expected in the Prairies without SCGP in place. As was the case in a similar exercise undertaken for Crow/WGTA and WGSA, Chart 8-13 is calculated on the assumption that without SCGP, the ratio of the value of farmland and buildings to realized net farm income would remain the same as its actual historical value. That assumes, however, that farmers value payments under government programs as much as they value payments from the market. Since there is some evidence that this is not the case, the implication is that the actual value of farmland and buildings may at least partly reflect what would happen if a program like SCGP were not in place.[36] In other words, land values in the absence of SCGP may be greater than the estimates presented on the lower line of Chart 8-13.

Economic Spinoffs

Deficiency payments clearly provide major benefits to agricultural-input suppliers. For many producers, the deficiency payments in the spring of 1987 provided a cash flow that enabled them to purchase supplies such as fertilizer and chemicals without having to incur an additional debt. Financial institutions have been major beneficiaries; without the SCGP, a number of their clients would have had to default on loan payments or, more seriously, go into bankruptcy. The economic spinoffs from the deficiency payment have also benefited the entire Prairie economy.

Chart 8-12

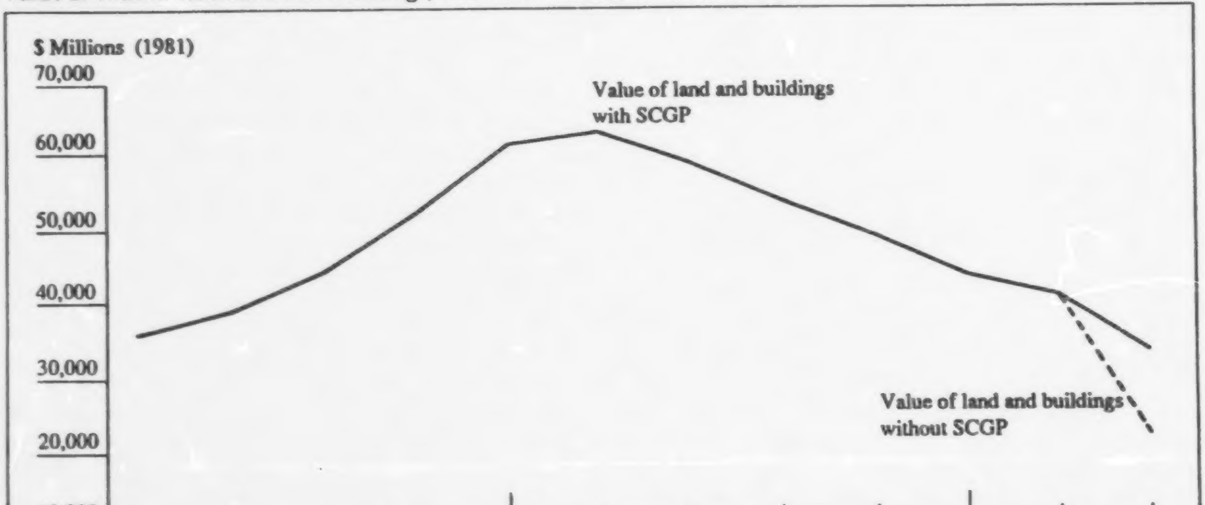
Realized Net Farm Income, With and Without SCGP, Prairie Provinces, 1976-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

Chart 8-13

Value of Prairie Farmland and Buildings, With and Without SCGP, 1976-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

Appendix A presents a framework for analyzing the economic spinoffs of a deficiency payment. The analysis shows that the magnitude of the benefits that the Prairie economy might expect exceeds the treasury cost by a factor of anywhere between two and fifteen. It is also pointed out, however, that the multiplier effect of a deficiency payment may be quite different in boom and bust periods. For example, in the mid-1980s, a large portion of the money received in deficiency payments would have gone to financial institutions to service debt. That money was therefore unavailable to be spent in the provincial or regional economy. On the other hand, when the industry is booming and new borrowing and spending is taking place, the multiplier could be much greater.

Crop Insurance

Resource Allocation

The major effect of crop insurance (CI) is to reduce the uncertainty associated with the production of grains and other crops in the Prairies. At the minimum, this implies that producers faced with poor or lost crops from natural causes will not see their gross receipts and income fluctuate as they would in the absence of the program.

To the extent that crop insurance is successful in reducing the risk associated with production, economic theory suggests that an increase in production will occur. If crop insurance is not in place, farmers may decide to play it safe and use relatively small amounts of inputs. Although doing so would reduce expected yield and expected profits, the farmer may prefer that, if it means less chance of a poor crop. With crop insurance in place, however, producers may discount the possibility of bad years, arguing that should they occur, crop insurance will take effect. Such behaviour by all farmers would, of course, result in increased production.

There are many other dimensions related to crop insurance that require further examination and that are beyond the scope of this study: 1) Does crop insurance promote abuse and stifle farm-management initiatives? 2) Does crop insurance promote poor soil-management practices? 3) Should crop insurance be made compulsory? 4) If not, should drought programs and related assistance only be made available to those farmers who have taken out crop insurance? 5) Should crop insurance be based on individual yields rather than area yields? 6) What is crop insurance actually trying to achieve? In regard to the last question, it is important to recognize that crop insurance is a yield-insurance scheme and that the income coverage available fluctuates with world market conditions. Answers to these questions are badly needed, given the high risks in agricultural production.

International Arena

It was argued above that agricultural programs that increase output may be sending the wrong signals to the countries that Canada competes with on the international market. What is important to realize, however, is that output expansion that results from agricultural policy should be seen as detrimental only if it occurs when prices are falling and world markets are weak. If a program such as crop insurance has the effect of increasing output during all types of market conditions and if it is directed at correcting some deficiency in the market, then it can be argued that such a program "plays fair."

Farm Income

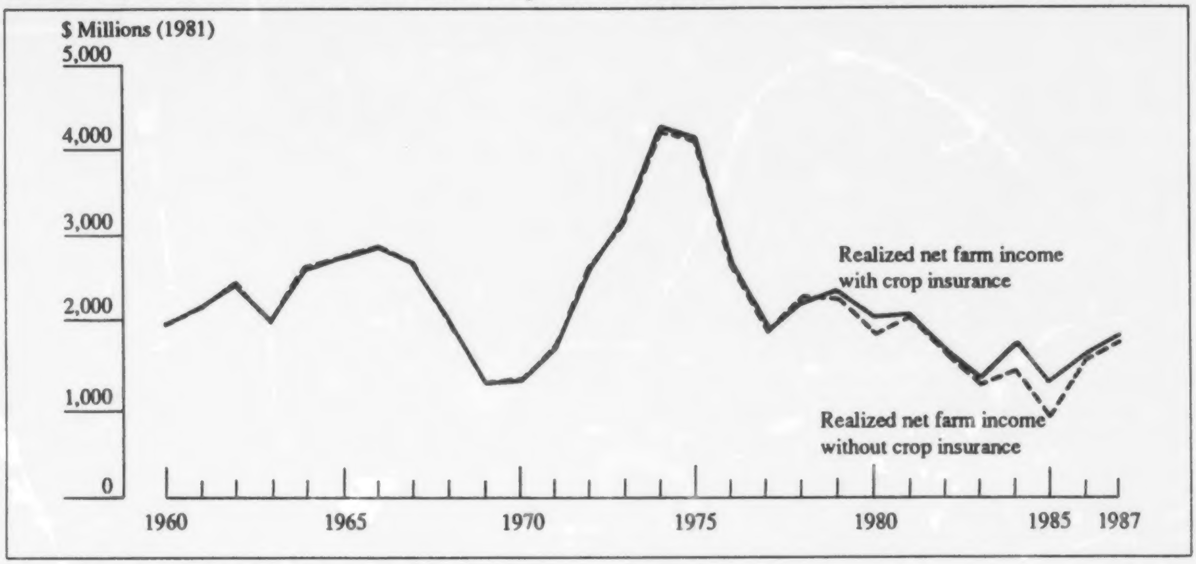
Crop insurance was designed to reduce the fluctuations in gross receipts and income that result from volatility in yields and output caused by the weather. The extent of this reduction can be seen by examining Chart 8-14. During the late 1960s and early 1970s, premiums paid by farmers outweighed the insurance payments received under the program. The overall reduction in income that resulted, however, was not very large. Since 1979, and particularly in 1984 and 1985, net farm income has been substantially raised over and above what it would have been in the absence of crop insurance. The result is a reduction in the level of volatility of farm income experienced by producers in the Prairie region, as well as an increase in the average level of net farm income.

Crop insurance, therefore, has become a major transfer program during periods when the Prairie region experiences poor yields. That was the case again in 1988, since CI payments were at record levels because of the drought. In addition, the federal-provincial drought compensation program announced in November 1988 will add approximately $720 million to Prairie farm income.

The drought in 1988 illustrates that the degree to which crop insurance can stabilize income depends upon the market price at the time. Although grain and oilseed prices rose during the spring and summer of 1988, the low commodity prices in early 1988 meant that CI payments were lower than if the price increase had occurred a few months earlier. A comparison with the drought in 1985 is useful in this regard. Although the drought in 1988 was much more severe than

Chart 8-14

Realized Net Farm Income, With and Without Crop Insurance, Prairie Provinces, 1960-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

that in 1985, total payments in 1988, when compared with 1985, will not reflect the difference. That is because the prices at which the 1988 crop could be insured were significantly below the prices for 1985.

The impact of crop insurance is also highly dependent upon the severity of a crop loss. For instance, in the summer of 1988 many farmers in the Prairies who had received no rain in the spring were able to write their crops off completely. That meant they would not have to incur the costs of harvesting, but it also meant that in some cases they would be eligible for summer-fallow coverage the following year. On the other hand, farmers with only slightly better crops would be required to harvest them to determine their level of payment under the program. In addition, having grown a crop on the land, those farmers would only be eligible for stubble coverage the next year. Aspects of the program such as these result in actual and perceived injustices, which reduce the effectiveness of the program in stabilizing farm income.

Economic Spinoffs

If crop insurance actually has the effect postulated above – to increase the amount of inputs used in agricultural production – then farm-input suppliers can be seen to benefit from such a program. It should be noted that increases in the use of farm inputs such as fertilizer and chemicals not only benefit the suppliers of those inputs; they may also have an impact on the financial institutions that lend money to the farmers for their purchases. As well, greater emphasis on farm inputs is likely to lead to a greater need for farm machinery, thereby further increasing the benefit that farm-input suppliers as a group will derive.

Two-Price Wheat

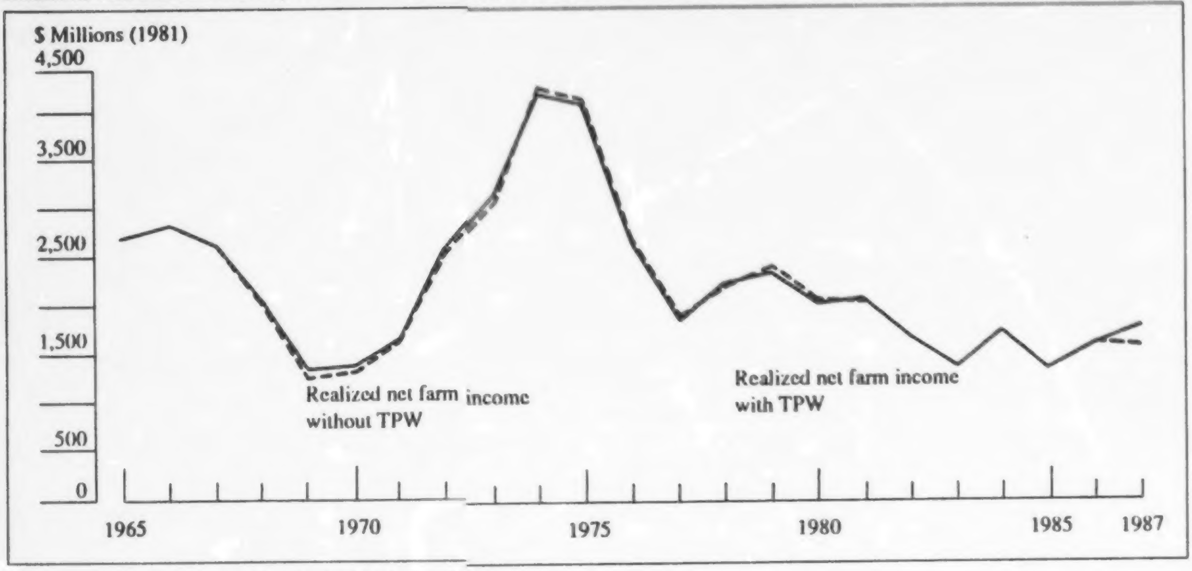
As indicated earlier, the two-price wheat program (TPW) has been dismantled. The following analysis of its historical impact is nevertheless important, in that discussions concerning programs similar to that are likely to emerge in the future.

Resource Allocation

The impact of TPW on the Canadian economy was multifold and varied from period to period (Chart 8-15). During the period 1967-73, the domestic price was above the world price, and producers were being subsidized, although the level was quite small. In the initial part of that period (1967-72), consumers incurred the cost of the subsidy through

Chart 8-15

Realized Net Farm Income, With and Without Two-Price Wheat, Prairie Provinces, 1965-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics.*

higher bread and flour prices; during the latter part (1972 to 1973), however, government provided the funds directly from the treasury. In the period 1973-78, the price realized by producers was generally above the price paid by Canadian millers, indicating that consumers and millers were benefiting from the program. During most of that period, wheat producers were not the source of funds for the program. Instead, the federal government was incurring the cost of providing producers with the export price, enabling millers and consumers to purchase wheat at a price below the export level.

From 1978 through 1980, the export price was above the ceiling price established under the program, resulting in consumers and millers being subsidized at the expense of producers. The loss in income experienced by Prairie producers under the program was small, however. During the period 1980-86, the export price fluctuated within the band established under the program, indicating that neither consumers nor producers were being subsidized or taxed. Since 1986, the export price has dropped below the domestic price, and producers have been subsidized by consumers.

On average, the impact of TPW on Prairie farmers was minimal. During some periods, producers gained; at other times, producers had to pay the cost of subsidizing millers and consumers. In 1987, however, Prairie farmers did receive a reasonably large transfer under the program. That payment, however, is unlikely to have had much impact on resource use in the Prairies, since it implied a price increase of only 17 cents per bushel in current-dollar terms. That relatively small price increase, combined with a very low, short-run supply elasticity, implies a very small change in resource allocation.

A continuation of the TPW program as it existed in 1987 would likely have had a much greater impact on resource use in Ontario than in the Prairies. Under TPW, producers in Ontario received the higher domestic price on virtually all of their production, implying that the impact on production from that region may have been much greater. It has been estimated, for instance, that if the domestic price of $7.00 per bushel were maintained for 20 years, wheat production in Ontario would increase to the point where that region would supply approximately 20 per cent of the domestic market. That compares with a market share of 4 per cent at the current time.[37]

Thus if the TPW program had continued in its 1987 form, it is expected that it would have had a definite impact on resource allocation within Canada. In particular, TPW had the ability to alter the location of wheat production in Canada, so it would no longer be based on regional comparative advantage.

International Arena

As the above analysis indicates, TPW had little impact historically on the quantity of wheat produced in Canada. As a result, the program, at least for the majority of the time that it was in effect, likely had only a very small impact on the international grain market.

A continuation of TPW in its 1987 form would almost certainly have increased production above what it would have been in the absence of the program, however. The expansion in output would have come mainly from producers in central Canada. While that increase in production would have been only minimal, it is not a result Canada would have wanted to occur.[38]

Farm Income

The impact of TPW on Prairie farm incomes was generally quite small (Chart 8-15). Over the years, producers both benefited and lost under the program. It was only in 1987, however, that the amount transferred under the program was substantial.

Income Distribution

The impact of TPW on the distribution of income within agriculture during periods of low world prices could have been expected to be much the same as that of a deficiency payment, since both programs effectively increased the price of grain to the producer. Since TPW changed the pooled price received by Prairie producers by only a small amount in most years, however, the effect on income distribution is likely to have been very small.

Much more importantly, TPW involved the redistribution of income from Canadian consumers and millers to Canadian producers, or vice versa. If the domestic price was above the export price, then consumers were being taxed, while farmers benefited. If, on the other hand, the domestic price was below the export price, then farmers were being taxed, and consumers benefited.

TPW also had the potential to affect the distribution of income between provinces. Under TPW, as it was structured in 1987, producers outside western Canada were not required to sell a certain proportion of their output to the domestic market.[39] Instead, they were able to sell to whichever market – domestic or export – had the higher price. As a result, farmers in eastern Canada were not taxed when the export price rose above the domestic price, and they were always able to benefit from the higher domestic price when the export price fell below that level.

Land-Price Fluctuations

Given the relatively small transfers that took place under TPW over the years, the impact on land values could be expected to have been very small. In 1987, payments under TPW may have helped to slow the drop in land values. If farmers discounted a portion of those payments when determining how much to pay for land, however, the removal of TPW would have caused land values to fall by only a small amount.

Economic Spinoffs

The impact of TPW on input suppliers is likely to have been rather small, although the slight reduction in downside risk and uncertainty that it provided would have been of some assistance.

If TPW had not been removed, it would have had a substantial impact on one sector of Canadian agriculture – the milling industry. Under the Canada-U.S. Free-Trade Agreement, U.S. millers will be able to buy wheat at the world price, mill it into flour, and export it into Canada. If Canadian millers were forced to pay a higher price for wheat that is to be milled and sold domestically, they would be unable to compete with their U.S. counterparts. Thus one of the reasons for dismantling TPW appears to have been the anticipated Free-Trade Agreement.

Agricultural Credit

A number of different credit programs at both the federal and provincial levels have been introduced over the years. Since it is impossible to discuss all of them, the main features of several representative programs will be examined. In particular, the federal Farm Credit Corporation (FCC) and the Agricultural Credit Corporation of Saskatchewan (ACC) will be analyzed for their impact on Prairie agriculture. Institutions similar to ACC exist in Manitoba and Alberta; the impact is expected to be analogous to that of ACC.

Resource Allocation

The FCC loans over the years were primarily directed at new farmers wishing to enter agriculture or small farmers wishing to expand. To the extent that the loans accomplished that objective, they have not likely had much impact on output. Since in the absence of FCC loans the land would have been purchased anyway, the question is which owners would have produced the most – the farmers who required FCC assistance or the farmers who would have been able to finance the land purchase themselves commercially? The answer to that is generally "neither."

Agencies like ACC were established primarily for the purpose of providing loans to farmers who wanted to improve or expand their livestock operations or to undertake irrigation of special crops and forage. The FCC loans were also available for livestock producers who would otherwise not have been able to obtain commercial credit. The riskiness of such ventures suggests that provision of credit by the government may well have represented a net increase of capital to that particular sector of Prairie agriculture, thereby encouraging resources to move into those types of operations. The impact of other ACC activities, such as the Livestock Cash Advance Program, has been more definite in terms of increasing livestock numbers.

The activities of ACC have not been limited to supplying credit for livestock and specialty-crop expansion, however. For instance, the government of Saskatchewan instituted a $25.00-per-acre production loan at 6 per cent interest in the spring of 1986, the purpose of which was to provide operating capital for spring seeding. That program was given to ACC to administer. Loans such as these may have affected production in that particular year if they enabled farmers to purchase inputs, such as fertilizer, that they might not otherwise have been able to purchase. The effect, however, is likely to be small.

In summary, the net impact of these credit programs has likely been to increase agricultural output to some degree, with the increase being greatest in livestock and specialty crops. If it could be assumed that all markets are perfect, this shifting of resources would appear to be inefficient. It is extremely unlikely that all markets are perfect, however. For instance, if the higher risk associated with livestock and specialty crops caused commercial lenders to remove themselves partially from that area, then the provision of credit by the government may have improved resource allocation. In addition, if programs like WGTA have had the effect of penalizing livestock production to some degree, then perhaps encouragement of that activity would be beneficial. On the other hand, the availability of FCC programs for grain farmers may have resulted in farmers who were eligible for this program choosing grain over livestock. In conclusion, it is difficult to say precisely what the impact of credit has been on resource allocation.

International Arena

The impact of credit programs on Canada's role in the international market would appear to be detrimental. While the effect on output appears to be small, the more serious issue is that the use of any subsidies is viewed negatively by Canada's trading partners. In short, the notion is that subsidies enable Canadian producers to sell their products on the world market at a lower price than would otherwise be the case.

Farm Income

Loans for livestock production and specialty crops are probably a stabilizing force on aggregate Prairie farm income, since diversification can help to provide a buffer against the volatile international grain markets.

Whether or not agricultural credit actually increases agricultural incomes is another question. If subsidized loans lead to an increase in the price of land, the only beneficiaries will be those farmers who, in the initial stages of the program, sell their land and leave agriculture. The new or expanding farmers would be no better off and might even be worse off. For example, while the interest rate that those farmers must pay would be lower, the higher amount of the loan required to purchase land would result in the debt service charges being relatively unchanged. In addition, if interest rates should suddenly increase, farmers would have to pay interest charges on a larger amount of debt, which in turn makes them more susceptible to fluctuations in the economy.

As will be seen below, agricultural credit programs have been one of the major factors in the expansion of credit during the late 1970s and early 1980s. If, as is argued later, this increased supply of credit caused land values to increase, then the only farmers who could benefit would be those who already owned land. Farmers entering the industry or expanding their operations would have been forced to pay a higher price for land and yet would have had no greater ability to service the debt.

Income Distribution

The equality of income between farmers can be enhanced or reduced by the subsidization of credit. For instance, ACC and FCC loans for enterprise expansion have guidelines that exclude the wealthier farmers from obtaining subsidized credit. Such restrictions should, over time, serve to equalize incomes in farming.

That would only be the case, however, if the subsidized interest rate or the increase in credit does not end up being capitalized into land values. If credit programs effectively raise the price of land to all farmers, then the smaller or less well-off farmers may find themselves unable to compete with the wealthier farmers for the higher-priced assets. This will result, in most cases, in an increase in income inequality and will further affect the structure of agriculture in supporting a trend to larger and fewer farms.

The production-loan program and the Livestock Cash Advance Program of ACC have no restrictions on who can obtain benefits. The universal nature of those programs and the fact that access to credit is based on the number of acres or the number of livestock owned means that the larger farmer will receive greater benefits.

Land-Price Fluctuations

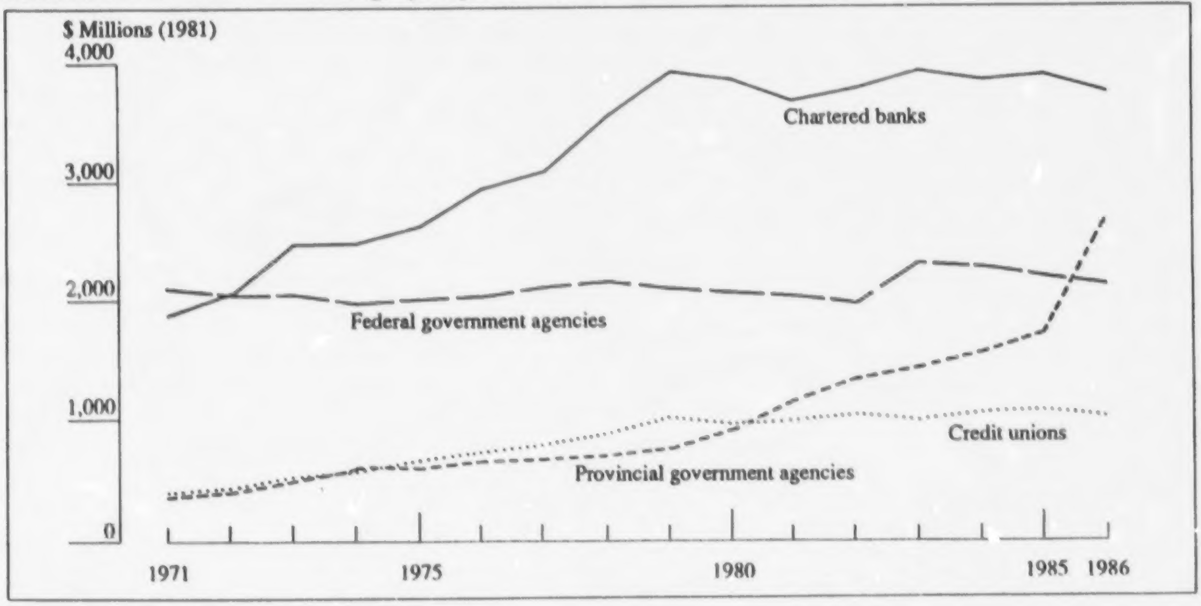
One of the most important factors in explaining the fluctuations in land values during the 1970s and 1980s appears to be agricultural credit policies. In particular, during the late 1970s, the total level of farm debt increased dramatically, primarily as a result of the activities of the chartered banks, credit unions, and provincial and federal government agencies. Chart 8-16 illustrates the level of outstanding real Prairie farm debt, by major financial institutions. As will be seen, that expansion of credit was one of the factors behind the land-price increases.

The expansion of credit during the late 1970s can be traced to a number of factors. (In addition to the factors discussed here, expectations play an important role; see Chapter 9 for a discussion of that point.) One of the more important factors was a change in legislation during the late 1960s allowing the chartered banks to make long-term mortgages to farmers. Prior to this change, those institutions were not permitted to lend on the basis of mortgage security. Also important was a change made to the *Farm Credit Act* in 1975, which allowed FCC to make loans for agricultural assets based on the market value of those assets. Previous to that change, FCC was required to evaluate loans based on the productive value of the assets.[40]

The impact of those changes was to alter the role played by FCC and to dramatically increase the credit supply to agriculture. The role of FCC has always been that of a residual lender – i.e., to supply credit needs that were not being met by the private sector. During the 1960s, the lending restrictions on private financial institutions meant that FCC was also the dominant long-term lender in the agricultural market.

Chart 8-16

Real Prairie Farm Debt Outstanding, by Major Financial Institution, 1971-86



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

With the change in legislation, private-sector financial institutions began to expand their loans (see Chart 8-16). As a residual lender, FCC continued to supply agricultural credit. In fact, as Chart 8-16 illustrates, the total value of FCC loans remained relatively constant over the years. The entrance of the private sector, however, meant that most of the relatively low-risk loans were now being supplied by these financial institutions. Thus the result of FCC continuing to lend money was not only that the supply of credit was increased but that the overall credit-worthiness of the borrowers was decreased.[41]

The expansion of credit was further exacerbated by the fact that virtually all the financial institutions involved in agricultural lending in the 1970s based their lending decisions on the current market value of the asset being purchased. In other words, lending was based on short-term considerations, with little or no consideration given to the long-run ability to pay. With the changes to the *Farm Credit Act*, FCC was no exception.[42]

The result of basing credit-worthiness on the market value of an asset is that an initial increase in asset values can be used to support an expansion of credit to purchase those assets. If this expansion in credit leads to a rise in asset values, then a cycle can emerge in which both the price of assets and the amount of credit available trend upward. That can occur even when the underlying economics of purchasing land are not favourable.

There is considerable evidence that this is what happened to asset values in Canadian agriculture. As the Report of the Standing Committee on Agriculture observes,

> . . . in the 1971-81 period, there was a negative relation between current income and outstanding long-term debt. This suggests that the industry was being financed not in response to falling income, but in response to rising land values.[43]

In summary, Canadian agricultural credit programs in the 1970s were pro-cyclical with respect to the general economic health of the industry – i.e., more money was made available when the industry was booming. As will be argued in Chapter 9, the major impact of these policies was to create the underlying conditions for the land-price inflation that occurred in the late 1970s and early 1980s.

As mentioned above, provincial and federal governments also made loans available to livestock enterprises. These should generally have had no effect on land prices. An expansion of cow herds over and above normal levels, however, might be expected to increase the price of pasture land and the price of cows.

Economic Spinoffs

To the extent that subsidized credit increases the output of agricultural products, it can also be expected to increase the demand for agricultural inputs. That is especially true if credit is made available for the purpose of purchasing farm inputs – e.g., the production-loan program of ACC.

Summary

The programs that have been introduced to assist agriculture in the Prairies have had a number of effects on that region. Taken individually, the impact of the programs has been to increase production slightly, to stabilize income, to prevent land values from falling, and to improve the economic health of the region.

Overall, the resource-allocation effects of the programs examined in this chapter are estimated to have been small. That was particularly true prior to the mid-1970s, when income transfers under government programs were mainly limited to the Crow/WGTA and amounted to less that 10 per cent of realized net farm income. Since the mid-1970s, the impact of Crow/WGTA is estimated to have increased. While in the short run, production has not been greatly affected, there is some evidence that the long-run impact may be greater. More important, perhaps, is the visibility of an export-oriented program like Crow/WGTA in the international arena.

In terms of farm-income stabilization, programs like WGSA, SCGP, and crop insurance appear to have attained that goal reasonably well. Indeed, without those programs, the health of the Prairie economy, as well as that of the farm sector, would have been much worse during the period since 1985. It is also argued that while most programs did not have a major impact on the volatility of land prices, that was not true of credit policies. Indeed, those policies provided the basis for an increase in land prices in the late 1970s and early 1980s – an increase that is at the heart of the income and debt problems facing Prairie agriculture in the late 1980s.

The next chapter elaborates on the conclusions of this chapter by examining the aggregate impact of Canadian agricultural programs on the debt problem and on agricultural production.

9 The Aggregate Impact of Canadian Agricultural Programs on Debt and Income

The previous chapters identified the major agricultural programs in western Canada and discussed their individual impacts on the Prairie region. To gain a sharper focus, the programs are now examined together to determine their impact on the debt, income, and output of the agricultural industry. The problems of debt and income underlie the crisis facing Prairie agriculture, while the question of output is out the heart of the international trade talks that have been convened to address the disruptions on the world grain markets.

The analysis in this chapter is being done "after the fact." As time passes and as new data become available, it is always easy to criticize a program for failing to address problems that may not even have been correctly recognized at the time the program was put in place. Thus the criticisms that are made below are meant to be constructive in nature – in short, they should be seen as an attempt at understanding better the very complex problems that agriculture faces and should perhaps be used as the basis for devising new policies and programs.

Debt and Income

To obtain an overall view of the programs examined in Chapter 6 in terms of their effect on income, Chart 9-1 presents the level of realized net farm income for the Prairies, with and without the net payments made under the major agricultural programs. Taken together, the programs generally contributed less than 10 per cent of realized net farm income in the Prairies before 1977. In other words, in the period up to 1977, agricultural policy generally played a minor role in directly determining the level of agricultural income in the Prairies.

Since 1977, the level of payments to producers under the various agricultural programs has increased substantially. Weak prices in 1977 and 1978 triggered a payout under WGSA, while unfavourable weather conditions in 1979 and 1980 led to payments under crop insurance. The biggest increases in transfers to Prairie farmers, however, have occurred since 1985. Poor crops in 1984 and 1985 resulted in large claims; falling world prices resulted in payments under WGSA; and government expenditures under WGTA increased sharply. In 1986 and 1987, those transfers were supplemented by SCGP, payments under TPW, and deficits in a number of CWB commodity pools. In the absence of those programs, realized net farm income in the Prairies would have been negative during the period 1985-87.

Overall, the impact of the major agricultural programs has been to increase and stabilize realized net farm income for the Prairie region. For instance, although farm income in 1987 was only half of what it was in the boom period 1973-75, it was not significantly below the level of the late 1970s. The only other period in which realized net farm income was as stable was the decade of the late 1950s and early 1960s (Chart 9-1). During that period, however, grain prices were much more stable than they have been during the 1970s and 1980s (see Chart 1-2). The stability in this latter period has been achieved primarily by the transfer of income to the sector. While individual programs like WGSA and TPW did result in income transfers out of the sector in some years, on an aggregate level the programs have represented a net inflow of income to the Prairie agricultural economy.

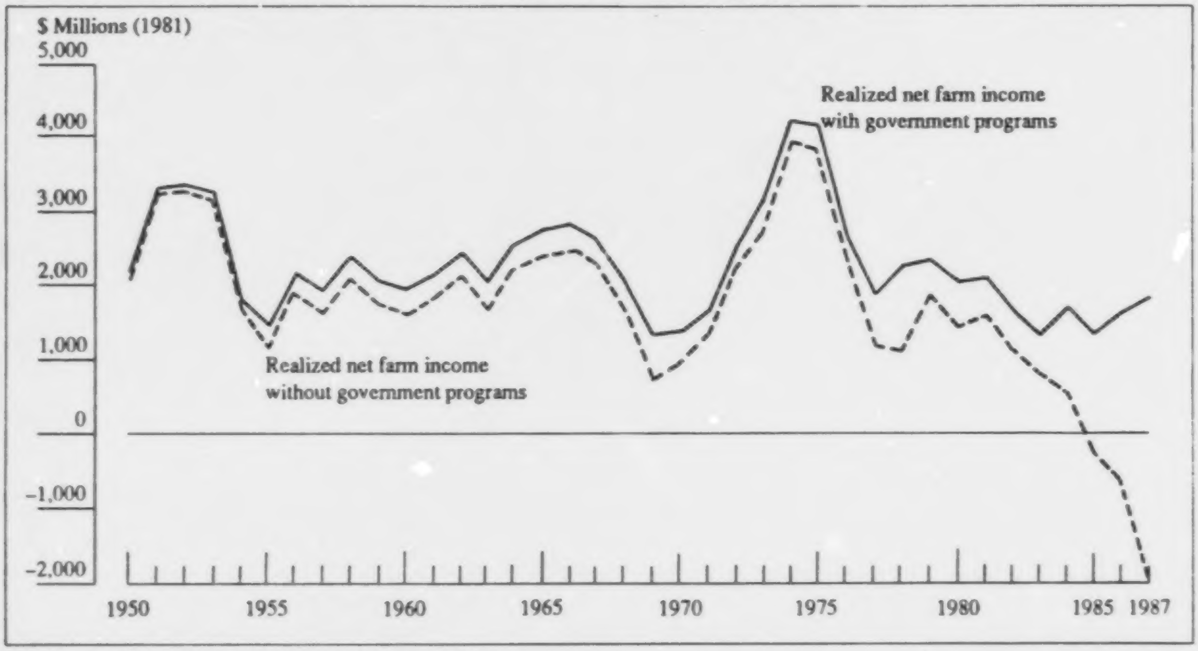
The effectiveness of Canadian agricultural programs in attaining the goal of income stabilization, however, raises a question. Why, if realized net farm income has been so stable, is Prairie agriculture in the crisis in which it finds itself today? Or to put it another way, if Canadian agricultural policy has been so effective at solving the income problem of agriculture, why has it not solved the debt problem?

The answers to those questions lie in the dynamics and uncertainty of international trade and in the relationship between asset prices and farm income. As Chapter 2 pointed out, the Prairie region is heavily dependent upon the international grain market. Over the last 20 years, that market has been very volatile.[1] This volatility brought about expectations on the part of producers that were incorporated into the amount they were willing to pay for agricultural assets, with the result that agriculture became overcapitalized. It is this overcapitalization problem that policy makers are attempting to address in the 1980s.

What is the debt problem? First, it is not the level of debt *per se*. If farmers have enough income to service their debt and if the value of their assets can support it, almost any level of debt can be handled without a problem. Nor does the debt

Chart 9-1

Realized Net Farm Income, With and Without Major Government Programs, Prairie Provinces, 1950-87



SOURCE Agriculture Canada, *Handbook of Agricultural Statistics*.

problem result from the fact that isolated farmers get themselves into a position where they cannot meet their principal and interest payments. Rather, a debt problem occurs when the level of debt for an entire industry becomes out of line with the level of assets and the level of income in that industry. The extent of the debt problem in Prairie agriculture can be seen from the fact that in 1987, the overall debt/equity ratio of the industry was between 1.0 and 2.8. This compares with a debt/equity ratio in 1985 of between 1.0 and 3.4.[2]

As was argued in Chapter 5, the relationship between income and asset values in agriculture is a very complex one, involving the rate of interest and the expectations that farmers hold regarding future levels of income. Using the capitalization formula examined in Chapter 5, the ratio of asset values to farm income can be written as

$$\frac{V}{R} = \frac{1}{r-g} .$$

Changes in either the rate of interest r or expectations g can cause that ratio to fluctuate.

The ratio of asset values to the level of income for the Prairie region is graphed in Chart 8-8. Over the period 1950-60, the ratio was quite stable, fluctuating around a value of 7 to 10. During that same time period, realized net farm income, which was quite volatile, appeared to be either falling (if one takes a view back to the 1940s) or fluctuating around an average level of approximately $2.2 to $2.3 billion (Chart 9-1). On the assumption that farmers expected net income from farming to remain at approximately that level (which implies a value of $g = 0$), a ratio of asset values to the level of income of 7 to 10 implies a value of r of somewhere between 10 and 14 per cent. If, on the other hand, it is assumed that farmers expected farm income to fall at a rate of 3 to 4 per cent (the actual rate of decline from the mid-1940s to the mid-1950s), then the implied interest rate is 6 to 10 per cent. An interest rate anywhere within that range would appear to be reasonable, particularly if it includes a risk premium.

While realized net farm income appeared to follow no discernible trend during the 1950s, that changed during the 1960s. Beginning in approximately 1955, net farm income began an upward trend at a rate that averaged approximately 4 per cent per year for the following decade. If farmers expected that increase to continue forever, the price paid for land would be altered. That, in fact, is precisely what happened (see Chart 2-5). During the late 1960s, the ratio of asset values to farm income increased dramatically, reaching a level of approximately 18 in 1969. Assuming that farmers believed realized net farm income would increase at a rate of 4 per cent a year, and using an interest rate of 9 per cent, the capitalization formula implies a ratio of asset values to farm income of 20. That, of course, is reasonably close to the values observed in the late 1960s.

The sharp drop in realized net farm income that occurred in the late 1960s appears to have led to a re-evaluation of farmers' expectations. That is reflected in the decline in the value of the ratio of asset values to farm income that occurred in the late 1960s and early 1970s. In fact, the return of that ratio to a value similar to that which had existed for most of the period after 1950 suggested that, once again, farmers did not expect farm income to experience any significant growth in the future and anticipated that it might even decline.

While there are many other factors at work in determining the level of asset values, it appears that from 1950 to the early 1970s there was a fairly close correspondence between actual values and what economic theory would suggest. Since the asset values suggested by theory are those values which can generally be supported by the level of income being generated in the industry, it would appear that farmers were acting in a manner that would avoid any serious debt problems.

That observation is extremely important when it is realized that since the early 1970s, the correspondence between actual land values and those generated by the capitalization formula appears to have broken down.[3] As illustrated in Chart 9-1, realized net farm income, expressed in constant 1981 dollars, jumped dramatically in the period 1972-75. It then fell almost equally as dramatically in 1976and has been trending slightly downward ever since. Notice that this downward trend occurred even though net payments to producers under government programs over the same period were increasing.

On the other hand, the value of farmland and buildings in the Prairies exhibited a different pattern. As realized net farm income increased in the early 1970s, so did the value of farmland and buildings. While the increase in realized net farm income was short-lived, however, the value of farmland and buildings continued to rise. The result was shown in Chart 8-8, where the ratio of asset values to farm income rose from a value of just below 10 in 1975 to a value of nearly 40 in 1983.

The continued rise in this ratio from the early 1970s to the early 1980s suggests three possibilities: 1) a falling interest rate (*r*); 2) a rise in the expected growth rate in farm income (*g*); or 3) a combination of (1) and (2). Each of these explanations has problems, however. While real interest rates did fall during the early 1970s as a result of the rapid inflation during that period, by the mid-1970s they had begun to increase again. As is evident in Table 9-1, by the late 1970s real interest rates were approximately 3 per cent, while by the early 1980s they had increased to somewhere between 7 and 8 per cent. Thus on the basis of real interest rates alone, the ratio of farm assets to farm income should have been falling. Perhaps more to the point, however, is the fact that while real interest rates did fluctuate considerably during the 1970s and 1980s, there appears to be no evidence that they had permanently deviated from a long-run value of somewhere in the neighbourhood of 5 per cent. If a risk premium of 4 to 5 per cent is added to that figure, the result is a rate remarkably close to the 8 or 9 per cent that seemed to govern farmers' decisions in the 1950s and 1960s.

As mentioned above, the other possibility is that the expected growth rate in real net farm income was rising

Table 9-1

Real Interest Rates in Canada, 1970-87

	Prime interest rate	Change in GNEIPD[1]	Real prime interest rate
	(Per cent)	(Percentage points)	(Per cent)
1970	8.17	4.58	3.59
1971	6.48	3.09	3.39
1972	6.00	5.00	1.00
1973	7.65	9.29	−1.64
1974	10.75	14.81	−4.06
1975	9.42	11.39	−1.97
1976	10.04	9.37	0.67
1977	8.50	7.48	1.02
1978	9.69	6.67	3.02
1979	12.90	10.33	2.57
1980	14.25	11.33	2.92
1981	19.29	10.62	8.67
1982	15.81	8.70	7.11
1983	11.17	4.97	6.20
1984	12.06	3.42	8.64
1985	10.58	3.14	7.44
1986	10.52	2.96	7.56
1987	9.52	4.55	4.97

1 Gross National Expenditure Implicit Price Deflator.

SOURCE Statistics Canada, *Canadian Economic Observer*, Cat. 11-010 and 11-210.

throughout the 1970s and early 1980s. The evidence, however, is that this did not occur, since although farm incomes increased during the period 1972-75, realized net farm income after that time generally trended downward. Thus the suggestion that the growth rate *g* was both positive and growing does not accord with what actually happened.

Here, then, is the dilemma. The high asset values in Prairie agriculture appear to be best explained by the assumption that farm income was expected to grow at a positive rate of anywhere between 3 and 6 per cent per year. Upon examination, however, it appears that income has not behaved in that manner. While it would be reasonable to believe that during the mid-1970s the industry had expected that farm incomes would increase (this would explain a temporary bubble in land prices for that period), it is less easy to believe that it would have continued to have that expectation after farm incomes dropped to a level roughly equal to the long-run average.

In searching for explanations for the phenomenon of optimistic expectations, it is tempting to say that agricultural policy provides the reason, or explanation. The argument would be that through the use of income transfers, the federal and provincial governments were able to sustain the level of income growth, thus fulfilling farmers' expectations that income would continue to grow. Such an explanation, however, does not accord with the data. The level of realized farm income includes all government payments to producers; and as noted above, realized net farm income did not grow during the late 1970s and early 1980s. In fact, as Chart 9-1 illustrates, government programs, at best, served only to maintain the level of income. In the absence of those policies, realized net farm income would have fallen even more than it actually did.

While income transfers under government programs do not appear to provide a solution to the dilemma, it is possible that agricultural policy may still have had an effect. There are at least two ways in which that could have occurred. First, as the discussion in Chapter 8 pointed out, changes to Canada's agricultural credit policies led to an expansion in the amount of credit available to the agricultural sector, which in turn facilitated an increase in land values. Second, agricultural policy may have directly or indirectly altered the expectations of the agricultural industry, which, as was seen in Chapter 5, can have a major effect on the price that farmers and others in the industry are willing to pay for land.

Chart 8-16 illustrated the level of outstanding credit, in constant 1981 dollars and by major financial institution, for the period 1971-86. As was pointed out in Chapter 8, the significant growth in debt over that period was due in part to the change in legislation that allowed chartered banks to offer long-term mortgages to farmers. As might be expected, the banks took the opportunity to expand their agricultural portfolio. As Chart 8-16 illustrated, the result was a doubling of the level of agricultural debt by commercial banks. During the late 1970s, credit unions also pushed agricultural loans, expanding their level of outstanding credit by a factor of three.

The overall expansion of credit was not solely the result of the commercial banks and credit unions increasing their level of outstanding debt. As Chapter 8 pointed out, the provincial governments used credit programs to encourage young farmers to enter the industry or to encourage greater specialization in an enterprise. Provincial governments also used subsidized credit to lower the cost of inputs. The result of these programs was a sixfold increase in the amount of outstanding real debt from that source over the period 1971-86.

What is particularly interesting is that the largest gain in provincial government lending occurred in the period after 1979. That is precisely the period during which realized net farm income began to trend downward. Thus provincial governments were expanding the amount of money available at precisely the time when agriculture was becoming less profitable. While not all of the credit was made available for land purchases, it can nevertheless be expected that this was one of the major factors that kept asset values rising.

Given the significant increases in debt to the commercial banks, credit unions, and provincial governments, the relatively constant level of credit supplied by the federal government meant that the total amount of credit increased substantially over the 1970s and early 1980s. It is important to phrase the discussion in this manner, since the decision by FCC to maintain its level of credit was a conscious one. As noted in Chapter 8, the FCC has always been a residual lender. Prior to the change in legislation governing agricultural mortgages, FCC financed those farmers who were relatively good credit risks but who could not borrow from the commercial banks.

With the change in legislation, the commercial banks were able to finance those particular farmers; that left FCC to finance those farmers with riskier portfolios. The fact that they chose to do so is an indication that they felt it was an appropriate policy to be pursuing. In fact, FCC had been criticized in the early 1970s for being too conservative in its lending policies. The change to the *Farm Credit Act* in 1975 that allowed FCC to lend on the basis of market-value security, as well as further amendments in 1981 that permitted FCC to supplement government borrowings with money from the capital market, was a further indication that the government believed that FCC should be actively pursuing farm loans.[4]

The result of FCC pursuing that policy had two effects. First, the overall level of agricultural credit increased. As will be seen below, the effects of that expansion were amplified as a result of the types of lending policies in place during the late 1970s and early 1980s. Second, the number of high-risk loans increased. These have not only threatened the financial viability of FCC (as of mid-1988, FCC was technically bankrupt), but are a fundamental part of the crisis facing Prairie agriculture.

As Chapter 8 illustrated, the dramatic expansion in the level of money made available for agriculture was made worse by virtue of the type of lending policies in place prior to the early 1980s. Loan applications to all of the financial institutions were typically evaluated in terms of whether the farmer had sufficient collateral to support them. Since the land and buildings being purchased were used as collateral, that policy essentially tied loan approval to growth in the value of assets. As long as asset values were increasing, financial institutions would advance money to purchase them, because sufficient collateral was available.[5]

Notice, however, that such a policy is not related in any manner to the asset-valuation formula presented above. On the basis of the theory behind that formula, loans should be advanced for the purchase of assets only if the long-run returns will be sufficient to cover the cost of the loan. The use of the collateral approach, however, breaks the link between returns and asset valuation. By doing so, it creates the possibility that should incomes fall, the borrower will be faced with a double problem: first, lower income will mean less ability to pay off the debt; and, second, if lower income reduces asset values, the collateral for the loan will evaporate. That, of course, is exactly what happened to Prairie agriculture. Credit, while an asset in boom periods, is a liability in the bust cycle.[6]

Lending policies and expansion of credit, however, are not sufficient by themselves to explain the growth in asset values that occurred in the late 1970s and early 1980s. Before those factors could have combined to obtain such a result, the industry would have had to have had expectations that profitability would continue to grow. The federal government clearly had such beliefs. Table 9-2 presents the price forecasts for wheat, barley, and canola made by Agriculture Canada in April 1978. These indicate an expectation that grain and oilseed prices were going to continue to escalate. That same view of the world was reflected in the 1981 Agri-Food Strategy; the problem facing Canadian agriculture was thought to be that of how to produce output and get it to market.[7]

Table 9-2

Forecasts of Grain and Oilseed Prices Made by Agriculture Canada in April 1978

	Forecast for:		
	1979	1983	1987
	(Dollars per bushel)		
Wheat	4.50	5.83	7.36
Barley	2.30	3.34	4.21
Canola	6.10	7.63	9.83

SOURCE David R. Harvey, *Christmas Turkey or Prairie Vulture: An Economic Analysis of the Crow's Nest Pass Grain Rates* (Montreal: The Institute for Research on Public Policy, 1980).

It should be noted that it was not only Agriculture Canada who subscribed to the view that agriculture was going to continue in its prosperity. Although there were some exceptions, financial institutions, fertilizer and chemical companies, machine manufacturers, and academics all had expectations that, despite the downturn in prices that had occurred in the late 1970s, prices were going to strengthen. This view was supported by rapid inflation in the general economy, which suggested that the prices of everything were going up. With this view so predominant in the industry, it is perhaps not surprising that farmers and their lenders believed that farm incomes were going to increase and that the increase could support a rise in land values.

Other factors may also have contributed to the escalation in asset values. For instance, the 15-per-cent tax credit on farm-machinery purchases encouraged many farmers to purchase major pieces of new equipment in an effort to avoid paying tax. Not only did that increase the level of capitalization on the farm, it may have resulted in an inflation of machinery prices, as farm-equipment dealers took advantage of the tax credit to raise their prices.

Still another possibility is that farmers were not making their decisions on the basis of the economic model described in Chapter 5. For example, while the model determines the price of an acre of land by looking only at what that acre will generate in revenue (the marginal approach), farmers may, instead, make their land purchases on the basis of whether the entire farm can generate enough income to pay for an additional acre (the average approach). Using the latter approach, farmers will end up paying a great deal more for land than if they had used the marginal approach. Also worth investigating is the possibility that farmers suffer from "money illusion" – concentrating on the increase in gross revenues that are occurring without realizing that costs of inputs and household goods are also increasing.

Any explanation of the rapid increase in the ratio of asset values to realized net farm income that took place in the late 1970s and early 1980s must also take account of the decline that has occurred in that ratio since 1984. While farm income fell only a small amount during the period 1984-87, the value of assets declined dramatically. This phenomenon has important implications for the debt problem, since when asset values decline, the debt-to-equity ratio increases, making the farm enterprise much less financially secure.

The most important reason for the fall in land values during the mid-1980s appears, again, to be related to expectations. Recall that in the early 1980s, the ratio of the value of farmland and buildings to the level of realized net farm income ranged between 30 and 40. As argued above, this implies that returns from farming were expected to increase at a rate of 5 to 6 per cent per year in real terms. In fact, a ratio of that magnitude would be sustainable over the long run only if returns actually rose at that rate. If, as happened, returns remain relatively constant over time, that ratio must fall.

In other words, as farmers and others in the industry adjust their expectations to place them more in line with actual experience, the ratio of the value of assets to farm income must fall. Note that this can occur even when farm income remains relatively constant. Another reason that land values may fall even when income remains constant is that farmers may discount the payments made by government, believing them to be less permanent than the returns from the market. If that occurs, then governments may be unable to support land values with the use of income transfers, implying a further distinction between the debt problem and the income problem.[8]

Agricultural Output

It was concluded in Chapter 8 that the resource-allocation effects of Canadian agricultural programs have been relatively small and that the set of programs in effect during the 1970s and 1980s have not had a major impact on the level of grain production in the Prairies. This conclusion, however, leaves open the questions of why grain and oilseed production increased in the Prairies during this period (see Chapter 4), and why it is believed that, contrary to the Canadian experience, the domestic policies of countries like the United States and the EC have contributed to increases in production in those regions. The purpose of this section is to provide answers to those questions.

Canada

As Chapter 4 pointed out, the 1970s and the 1980s saw a change in the level and mix of Prairie agricultural production. The acreage of the major crops in western Canada expanded, grain and oilseed output increased, and Prairie farmers became much more specialized in grain and oilseed crops. It was argued in Chapter 8 that these shifts in production were primarily the result of technology changes adopted by Prairie farmers. One of the major reasons for the adoption of output-increasing technology was an expectation that grain prices and grain demand were going to remain strong. These expectations were also responsible for the land-value inflation that characterized the late 1970s and early 1980s (see previous section).

Canada's changing role in the international grain market may also have been a contributing factor in the output expansion. During the period between 1950 and 1970, the grain market was reasonably stable. This stability was due to the combination of: 1) a relatively stable international trading environment; 2) the international pricing agreements negotiated over this period; and 3) the fact that Canada and the United States were dominant players in the world market and pursued policies that encouraged stabilization. The United States adopted acreage set-aside programs and stockholding programs, while delivery quotas in Canada discouraged farmers from producing more output and forced them to hold greater levels of stocks.[9]

During the 1970s, however, the international grain markets changed considerably. As a result of oil shocks, large grain purchases, rapid inflation, and a freeing of international exchange rates, grain markets became much more volatile. At the same time, Australia, Argentina and the EC began to emerge as major exporters, reducing the role played by Canada.

As Chapter 7 pointed out, those changes resulted in a shift in Canadian agricultural policy. As long as Canada was a relatively large player in the world grain market, it was desirable to hold stocks and reduce production to some degree. This was particularly true if it was done in conjunction with the United States, since the result would be to raise and stabilize the world price of grain. As Canada began to perceive itself as a smaller player in the world grain market, however, that strategy was no longer as beneficial. A smaller market share meant that Canada believed that it could expand output with little impact on world price, thereby increasing total revenue.[10]

Canada's behaviour since the early 1950s can be interpreted in the light of the above remarks. It can be argued, for instance, that during the 1950s and 1960s, Canada exercised its market power by using marketing quotas administered by the CWB. When the marketing quotas used by the CWB are binding, Prairie farmers could be expected to increase farm size, summer-fallow more acres, and use fewer yield increasing inputs such as fertilizer and pesticides.[11] When the quotas are relaxed, however, the result should be less summer fallow, more chemical inputs, and a greater level of output. As Chapter 4 illustrated, this is precisely what occurred in Prairie agriculture during the 1970s and 1980s, a period during which Canada played a much less significant role in the world grain market.[12]

The evidence suggests that, compared to the 1950s and 1960s, quotas were less of a constraint to the marketing of grain in the Prairies than during the 1970s and 1980s. Carter, McCalla and Schmitz present data showing the level of stocks relative to production in the United States and Canada. They point out that prior to the 1980s, Canada tended to hold more stocks relative to production than did the United States. In addition, the level of stocks relative to production in Canada were generally larger in the 1960s and early 1970s than in the late 1970s and early 1980s, suggesting a different type of response to the market in those two periods.[13]

More specifically, Canada appears to have responded to weaker prices in the early 1960s and again in the late 1960s with substantial increases in stocks and a reduction in market price. When prices turned down in the late 1970s, however, the response was much less dramatic, suggesting a different strategy on the part of the CWB. Such a conclusion is all the more likely when it is noted that part of the reason for increased stocks during the late 1970s was an inadequate transportation system which left stocks of grain backed-up in the Prairies.[14] During the price downturn in the mid-1980s, Canada has responded by carrying virtually no stocks at all.

This change in Canada's strategy towards the world grain market was largely the result of a changing international trading environment. A substantial portion of this change in the international market was due to the domestic policies of the major trading nations. The response of Canada to these changes demonstrates what Carter, McCalla and Schmitz suggest is an important characteristic of the world grain market – the policy actions of one country can be expected to lead to policy reactions by other countries.[15]

In this case, Canada's policy reaction was to change the nature of the programs governing agriculture. As long as it was believed that Canada could influence the world grain market to some extent, then stabilization of income could be achieved by holding stocks and reducing production. The introduction of programs like WGSA, however, is an indication that Canada believed its role in the international market had changed. More precisely, when market power is reduced, income stabilization can more effectively be achieved by direct stabilization programs.

Thus Canadian agricultural policy appears to have influenced the level of grain and oilseed production in the Prairies. The impact, however, was not a direct result of the programs that were in place, but instead has taken the form of a change in policy regime. Although this change in policy resulted in yet another addition to world production, it was nevertheless an appropriate response for Canada, given increasing production by regions like the EC. This illustrates clearly how policy choices and the resulting policy reactions of countries can lead to situations where all countries are made worse off. It also indicates that the preoccupation policy makers and the industry in Canada have had with institutions and specific programs has meant that the impacts of basic changes in policy are often missed.

The change in policy regime did more than just increase Canada's grain and oilseed production. In combination with expectations that crop prices were going to remain strong, the relaxing of marketing quotas led to a movement of resources out of livestock and a specialization in grains and oilseeds (see Chapter 4). As Chapter 8 pointed out, livestock production in the Prairies prior to the early 1970s appears to have been influenced by the stocks of grain held by farmers. When farmers were unable to sell their grain directly, they often decided to sell it indirectly through livestock. The movement to less restrictive quotas, when combined with expectations that grain prices were going to remain high (and thus that livestock prices would remain low), led to the shift in the production mix described above.

In summary, the expectations that crop prices were going to remain high, when combined with a belief that marketing quotas were no longer a major constraint, led farmers to move away from livestock production and to increase their grain and oilseed output. Farming became more intensive: less summer fallow was used and greater amounts if fertilizer and chemicals were applied. While programs such as crop insurance and WGSA provided some stability in returns, thus encouraging the transition described above, the real forces leading to increased crop production appear to lie in the belief that grain and oilseed prices were going to remain high and that a market would be found for whatever was produced.

United States and the European Community

While it has been argued that Canada's commodity programs have not had a substantial impact on grain and oilseed production, it is interesting to consider why programs in the United States and the EC are supposed to be responsible for the large production increases seen in these regions. The basic answer is that farm programs in Canada are not the same as those in other countries.[16]

In the EC and the United States, price support levels are known with certainty at the time of planting. This is not the case in Canada. Payouts under WGSA are uncertain at the time producers make their planting decisions, with the result that farmers cannot be assured of a particular price for their output. This may be one of the reasons why more than 30 per cent of producers did not participate in the program when it was introduced in 1976.

Canada's deficiency-payment program, the SCGP, is fundamentally different from that of the United States. The SCGP was first announced after the 1986 crop was harvested and while it was extended for the following crop year, it is generally expected that this program will be phased out when prices rise. In short, the SCGP will not be a permanent part of Canadian agriculture. Even Crow/WGTA does not guarantee producers a price. While the freight rate subsidy does increase the final price farmers receive, this price still fluctuates according to market conditions.

The result of these features of Canadian agricultural programs is that Canadian producers do not face a fixed price that is known in advance. Producers in the United States and the EC, on the other hand, do face such a price. As a result, they are able to plan a longer-term strategy for their farms and invest in the equipment and technology necessary to achieve that strategy. One of the consequences of this investment is a greater level of production.[17]

A fixed price also encourages much more intensive agricultural production. This element is perhaps best seen in Europe where farmers apply extremely large amounts of inputs in order to achieve yields that are two or three times those of Canada. The intensive nature of production is also seen in the United States, where high target prices, in combination with acreage set-aside restrictions, provide farmers with an incentive to substantially increase yields on the acres that are in production. This is one of the reasons why farmers in the United States have historically chosen production processes (for example, higher-yielding varieties, fertilizer) that tempt to increase production per acre.[18]

Summary

This chapter has examined the overall impact of Canadian agricultural policy on farm debt, farm income and the level of agricultural production. In terms of farm debt and income, the events of the 1980s are a clear indication that the relationship between net farm income and asset values is not stable. In particular, changing expectations by farmers as to what the future holds can lead to changes in the relationship between returns to agriculture and the level of agricultural asset values. This has important implications for agricultural policy, since the ability of government to influence the level of income through stabilization and transfer programs does not automatically lead to a predetermined asset-value level. That was evident in the late 1970s and early 1980s, when asset values rose in spite of the fact that government programs did not raise the level of income to farmers. Similarly, during the mid- to late 1980s, government policies have been unable to stop the reduction in land values – which is one of the causes of the debt program – simply by continuing to prop up income values.[19]

Unless governments specifically attempt to influence both the level of income and the expectations of the industry, they will be unable to have any effective impact on the level of asset values. This, in turn, means that governments will be unable to deal with both the debt and the income problems facing agriculture unless they develop different policy and programs for each. For instance, a program established to deal with the problem of income may have little impact on debt, since while income is dependent upon current returns, the debt problem is a function of expectations, both currently and at different times in the past.

In terms of agricultural output, it was argued that, since the price boom in the mid-1970s, Canada no longer has found it beneficial to reduce its output as it once had done. This change in policy, as well as optimistic expectations that the world price was going to continue strong, resulted in Canada expanding its grain and oilseed production and reducing its livestock production. In particular, it was these factors, more than the particular agricultural programs in place, that determined the output level and mix of Prairie agriculture.

In comparison to agricultural programs in Canada, those in the United States and the EC have had a much larger impact on production. The biggest reason for this is the nature of the programs. The programs in place in the United States and the EC have generally established a fixed price on the basis of which farmers could make investment decisions and production plans. In Canada, the transfers and subsidies have mostly been "after the fact," in the sense that farmers generally did not know what price they wold be paid until the crop was grown. The result of this difference is that Canadian producers have generally responded less to production subsidies than have producers in some of the other exporting regions. Some of the constraints this imposes upon Canada and its selection of agricultural policies will be examined in the next chapter.

10 The Implications for Canadian Agricultural Policy

The previous analysis has numerous implications for the type of agricultural policy Canada should be pursuing in the future and the constraints that Canada has to face when designing and implementing this policy. A major concern of this study has been the twin problems of income and debt. The first section of this chapter summarizes and focuses upon the implications for agricultural policy, if a solution to these two problems is to be found. As has been stressed throughout the report, the debt and income problems have to be seen within the context of an international agricultural setting, which is the emphasis of the second section of this chapter.

Debt and Income

It has been argued in this report that agricultural policy has been reasonably effective in dealing with the income problem. Through income transfer and stabilization programs, Canadian agricultural policy has been able to keep the aggregate level of income of Canadian farmers at a reasonably stable level over the past decade. That was accomplished during a period in which income generated from the market fluctuated dramatically as a result of weather and international disturbances.

Agricultural policy, however, has been much less effective in dealing with the asset-value and debt problems. As argued in Chapter 9, the tools used to address the income problem are inappropriate for this task. Instead of concentrating on current income, an effective agricultural policy dealing with asset values and debt must focus on expectations and on the amount of credit available to the industry.

There are a number of reasons why asset values, debt, excess credit, and expectations were not considered in more depth historically. First, there was a general failure to see agricultural debt as a problem. As Chapter 5 pointed out, the Federal Task Force on Agriculture, while correctly identifying income as a problem, failed to present debt as a major concern. In fact, it was a lack of credit rather than too much credit that was viewed as a problem. The lack of credit was viewed as being responsible for the lack of entry into agriculture by new farmers and a failure of farmers to achieve their optimal size of operation. Ironically, the expansion of credit that did occur in the 1970s and early 1980s is now part of the problem. Indeed, as the analysis in Chapter 9 indicated, the lending institutions and their credit policies contributed to the crisis Prairie agriculture is facing in the 1980s.

A further reason why the debt problem was not identified as a major concern during the downturn in the agricultural industry that occurred at the end of the 1960s and why it has now emerged as such a major problem is that events over the last 15 to 20 years have been much more volatile than ever before.[1] During extremely volatile times, the debt problem is much more likely to emerge, since the problem is fundamentally one of expectations. Formulating correct price and income expectations in a new and volatile environment is very difficult. As a result, while it is easy to say today that the industry formulated incorrect expectations in the late 1970s and early 1980s, it should be recognized that making accurate predictions in the environment of those days was very difficult. The high volatility during this period has also pushed programs designed to deal with the income problem literally to the breaking point.[2]

How much government contributed to the incorrect expectations that appear to have existed over the past 15 years is unknown, since the picture is complicated by the fact that many other players in the industry had similar, if not more optimistic, expectations to those of Agriculture Canada. Regardless, clearly mistakes were made. Forecasts by agricultural-policy makers should be designed to reflect the tremendous uncertainty and volatility that exists in the industry. It is the role of government to take a long-term view that is consistent with what has been known for decades – agriculture is a boom-and-bust industry. This fact does not appear to have been fully appreciated.

What should the forecasts generated by policy makers consider? First that the real price of grain can be expected to continue its downward trend; there is no evidence that this historical pattern is being altered in any fundamental way. Research into new varieties is continuing and advancements in biotechnology can be expected to lead to further increases in yield.

Second, the forecasts should take into account the continued volatility in the world grain and oilseed markets. The 1970s and 1980s have been as volatile as any other time in history, if not more so. This will be true for the future. Some of the volatility will be completely unexpected. For instance, weather fluctuations will continue to have an impact on the market place and it will be impossible to determine when, or to what degree, they will occur. On the other hand, some of the volatility, while its exact timing and magnitude cannot be forecast, is nevertheless predictable in the sense that policy makers should know that it will occur. This point really is another way of saying that when things like prices, asset values, and production begin to get out of hand, economic and political forces will emerge to "correct" them.

As an example, the rapid rise in grain prices during the 1970s should have been an indication that production would eventually respond, which in turn would mean a fall in price. The rapid rise in price should also have been an indication that governments would change their policies in order to correct, or to take advantage of, the situation. For example, the high price of grain in the mid-1970s provided the EC with the perfect opportunity to bolster its support prices as well as the perfect rationale for doing so. The perfect opportunity was that high international prices meant that internal prices could be high without a great deal of financial cost, while the perfect rationale was that high world prices provided an indication that EC consumers needed a secure supply of food. High world prices also allowed the United States to raise target prices and loan rates to farmers without having to incur any financial cost.[3]

Given a competitive agricultural production sector, high commodity prices and increased farm income should also be an indication that asset values will be rising, which in turn will reduce the profitability of farming. In other words, policy makers, as well as farmers, financial institutions, and input suppliers, should be aware that boom conditions in agriculture can never be more than transitory. Designing programs, such as credit, around the belief that a boom period lies ahead, invites precisely the kind of crisis Prairie agriculture finds itself in, during the late 1980s.

Unlike the 1950s and 1960s where policy concerns focused on a lack of credit for agriculture, the 1970s and 1980s have seen a shift to too much credit and the resulting consequences. It is important that as the policy options for dealing with the debt problem – equity financing, interest-rate reduction, debt write-down, maintenance of the status quo – are examined, so that policy makers do not overreact once again.

Responsibility for taking a long-term view of the industry is not solely the concern of government or financial institutions. Given the high capital requirements of agriculture and the extreme volatility of the industry, it is important that farmers are also able to manage risk. Farmers must investigate and evaluate different methods of expanding or consolidating their operations that reduces the risk they face in the market and that allows them to weather the market downturns that will inevitably occur.

Forecasts by agriculturalists in general – and agricultural-policy makers in particular – should also take account of the fact that governments elsewhere in the world will intervene in their own domestic markets. As has been seen in the 1980s, the effect of such intervention on a country like Canada can be disastrous. This suggests at least two strategies for Canada. First, through such bodies as GATT, Canadian policy makers must take steps to ensure that the domestic policies of other countries have as little impact on the international market as possible. Second, policy makers in Canada must develop the mind set that changes in the international agricultural environment will occur and that individuals must be prepared for the consequences. The next section outlines some of the constraints that the international arena places upon agricultural policy.

Canadian Agricultural Policy and International Agriculture

Prairie agriculture is highly dependent upon the international grain and oilseed markets, markets which have become increasingly volatile during the 1970s and 1980s. This period has also seen other changes: a major shift in import markets from the developed nations to the developing and the centrally planned economies; an accompanying change in the mix of high- versus lower-quality wheat demanded by Canada's customers; a substantial increase in production in both developed countries and developing countries; and a loss of market power for countries like Canada and Australia. While there are a number of reasons for those changes, one factor has contributed to all of them – the domestic policies of the major importing and exporting nations.[4]

The changes outlined above reflect the major underlying forces that Canada must contend with when formulating agricultural policy. Since Prairie agriculture is heavily dependent upon exports of grains and oilseeds, any fluctuations in the international market for these commodities will have a significant effect on farmers, input suppliers, and other agricultural-related industries in this region. This is particularly the case since the Prairies have fewer production alternatives available to them (that is, alternative crops or livestock) when the price of grain falls than do other regions of Canada or many other countries in the world.

The shift in grain markets away from the developed nations and towards the developing and centrally planned economies also imposes some constraints. Important among these is that Canada will have to continue to pursue a strategy of selling both high-quality and lower-quality wheat in order to tap the markets that are expanding.[5] Finally, the changing power structure in the world market means that countries like Canada cannot be expected to unilaterally adopt policies which will reduce production and stabilize price as was once the case.

In order to address these concerns, Canadian agricultural policy will have to be extremely flexible. It must encourage diversification that provides the Prairie region with production alternatives that are viable during the periods when grain prices will inevitably be low. This means that policy must not discriminate against sectors such as livestock. As Chapter 9 pointed out, the shift in Canada's policy regime that occurred during the 1970s, along with expectations that grain prices were going to remain high, led to a movement of resources out of the livestock sector. Part of this diversification must also include the promotion of non-agricultural activities in rural areas, since the economic health of farmers is heavily influenced by their off-farm opportunities. The policy choices made by Canada must also ensure that Canada can quickly move into new markets – such as the higher-yielding, lower-quality varieties of wheat – as they develop.

Unfortunately, many of the problems Canada faces in terms of agricultural policy are beyond its direct control. In particular, the questions of shifting markets, increased volatility, increasing world production, and falling prices arise primarily because of the domestic policies of the other major importing and exporting nations. While Canada can develop an agricultural policy that will allow it to respond to these changes in the best manner possible, this is not enough; it should also attempt to try to influence the policy choices of other countries in a manner that will make both Canada and other countries better off.

Canada can compete effectively in world grain markets if the principle of comparative advantage is allowed to operate. However, in order for this to happen, international agriculture requires a major restructuring. Canada has played a major role in the trade talks that have been initiated to deal with that problem. This study concludes by focusing on the impact of Canada's agricultural policies in the international sphere, the type of strategy Canada should be taking towards the GATT negotiations, and the opportunities and constraints faced by GATT.

GATT and Agricultural Trade

Canada has been one of the leaders of the Cairns Group and is active in the GATT negotiations. Canada's participation in the agricultural negotiations at GATT is best seen in terms of an attempt to get some type of co-operation among the major players in the international market, especially grains and oilseeds. In attempting to co-operate, Canada has to keep in mind the programs which it has in place, how other countries will respond to any removal or modification of these policies, and what the consequences are for Canadian and Prairie agriculture if these programs are changed. The policy environment in the international grain trade is very similar to a poker game. Policy shifts on the part of one player can be expected to be quickly followed by policy shifts on the part of other players.[6] In this kind of environment, it is important for Canada to determine exactly what influence it has. Do other countries, for instance, react with policy changes when they see Canada taking different policy stances?

The response of GATT to the international crisis in agriculture has been to get all countries in the world to move towards a more market-oriented agriculture and to adopt policies that are not output-increasing. The precise nature of this response was examined in Chapter 6. While freer trade in agricultural products is highly desirable from the point of view of the world economy, the question must be raised as to whether it is realistic. This is particularly the case for the EC, who may have much to lose. It appears unlikely that a move to a free-trade solution in the international grain market will be able to raise the world price enough so that EC producers will be able to retain the level of economic well-being they now enjoy. Consumers in the EC may also believe that such a move is not in their best interests if politicians and producer groups are able to convince them that food security will be threatened by a move to a freer market.[7]

The GATT negotiators, and others involved in the process, argue that moving to freer trade does not mean the end of farm-support programs. Instead, they propose that income transfer programs can remain in place if they are decoupled – that is, if the support farmers receive is no longer tied to production. With decoupled programs, farmers could be compensated for any losses they incur in moving to freer trade, while at the same time the world market is not disrupted due to a production response from income support programs.

While it is unlikely that agricultural programs can ever be completely decoupled,[8] it is important that the programs which are chosen be as resource-neutral as possible. As the discussion in Chapters 8 and 9 indicated, some programs (like Canada's WGSA) have much less of an effect on output than do others (like those in the EC). In addition, if all programs potentially have some impact on production, then this too must be recognized as a constraint in the type of settlement that is reached. Perhaps most importantly, however, the notion of decoupling recognizes that like Canada, most of the other major agricultural countries have developed an agricultural policy that contains a myriad of programs, each of which has a different impact. By attempting to combine many of these programs into one, decoupling may enable agricultural-policy makers to more clearly see the results of their actions and to react more quickly to a changing economic environment.

The possibility that part of the current crisis in world agricultural trade is the result of a changing structure of the world market also poses some problems for GATT. As Chapter 9 noted, the stability that characterized the 1950s and 1960s was not a result of a completely market-oriented agriculture. Instead, it was at least in part the result of deliberate policies by the United States and Canada to reduce output and stabilize prices. This suggests that if the major exporters do not act as stabilizers in some fashion (for example, by holding stocks, reducing output), it may be impossible to move to a period of relative stability such as was the case in the late 1950s and 1960s. If part of the reason for the crisis of the 1980s is a change in world market structure, then it may be impossible to totally correct the situation without once again altering the structure of the market.

One method of achieving some reduction in production in all the major exporting countries could be acreage set-asides such as those used in the United States. While such a program is less effective if it is combined with price support programs, it has nevertheless proven itself in the past.[9] It should be noted that the EC would prefer acreage set-asides to liberalized trade, since with reduced production, the value of the payments required to export its surpluses would fall (lower domestic production means lower exports, while world price would be higher).[10]

Canada would also stand to gain from such a strategy, providing all the other major exporters adopted it at the same time.[11] Such a program would also put Canada in the position to seriously consider soil conservation and idling land. For example, the 10-year conservation set-asides adopted as part of the 1985 U.S. Farm Bill have seemed to have been effective in moving some of the more fragile land out of production. While arguments can be made for soil-conservation programs on their own ground, they have the further advantage of making a positive contribution to reducing the world supply of grain. Further research on the implications of soil conservation on future productivity and the international grain market is required.

In the absence of acreage-reduction programs or land-conservation programs, Canada and the other exporters may want to examine the costs and benefits of a stockholding program. Since the early 1970s, Canada has used buffer-fund type stabilization schemes (for example, WGSA), rather than physical storage programs in an attempt to stabilize income. As pointed out in Appendix C, the holding of stocks by a relatively small country like Canada is unlikely to raise the world price to any significant degree. Thus, in the short run, Canada will see few benefits from reducing its level of sales. However, if price is expected to rise, Canada may gain in the long run by holding stocks and selling them when the price is higher. The drought of 1988 clearly indicated that carrying stocks forward yielded high payoffs.

While Canada may benefit by a stockholding policy, individual producers will find it difficult to survive under this type of regime unless their income is stabilized by some other means. One of the implications of a stockholding policy is that during periods of weak markets, both sales and price will be low, resulting in a substantial fall in income. If farmers do not have some type of stabilization program in place, there will be an incentive for them to increase sales during weak market periods. As was seen, however, this will not be in their long-run interest, for it means that they will be giving up higher revenues in the future.

Appropriately structured stabilization programs can therefore assist in stabilizing world grain markets as well as reducing the fluctuations in farmers' incomes. However, a physical storage program may be required in addition to the stabilization fund. The importance of incorporating stocks into a stabilization policy is twofold. First, as argued above, holding at least some level of stocks is likely to be in the best interest of a country. Second, it sends a signal to other countries that the country holding stocks is willing to assist in reducing exports during periods of lower-market prices. This signal may be very important in terms of generating a more co-operative approach to the problems of the international grain trade. Further research is needed on the policy that would optimally combine stockholding and a stabilization fund.

Canada's stance at GATT has to be based on the belief that Canadians can gain under international agricultural trade liberalization. However, demonstration of this alone may not be enough. It is shown that while Canadian society stands to gain overall from freer trade in world agriculture, particular sectors will be made worse off. The question whether freer trade should be pursued in such a situation, or whether the sectors that are made worse off have to be compensated so that they end up no worse off than they were before, immediately arises. Note that if Canadian society could truly be made better off as the result of freer trade, it should be possible to compensate those who lose and still make some people better off.[12]

If the view is taken that sectors or industries must be compensated for any losses they incur in moving to freer agricultural trade, then the questions facing Prairie agriculture are: What programs does Canada have to give up in order to be part of an agreement; will the loss associated with these programs be offset by the gains from freer international agricultural trade; and what program changes or additions can be undertaken to ensure that compensation is obtained?

As mentioned in Chapter 8, one program that is clearly inconsistent with GATT is WGTA, since it has been identified as an export subsidy. Other programs, like WGSA and crop insurance, however, appear to be much more consistent with the GATT objective that domestic policies not disrupt international trade. It is important that all subsidies and transfers are identified. This is especially true of those that are less visible than WGTA, but serve the same purpose (for example, subsidies on other forms of moving grain such as U.S. and EC water transportation).

If WGTA has to be given up under GATT, and farmers are to be compensated for the loss of this program, then consideration has to be given to how this will be done. For instance, is paying the Crow Gap to producers an option, or does this also contravene GATT? Could WGTA be paid out in a "Crow Bond," or could it be combined into other programs such as WGSA? These are questions that the GATT negotiators and Prairie agriculture have to be asking as the GATT talks continue.

It should also be pointed out that the GATT negotiations concern all agriculture in Canada, not just grains and oilseeds. The result is that conflicts exist within Canadian agriculture on the question of international trade liberalization. While the Prairies generally support the initiatives under GATT, agriculture in central Canada, because of the predominance of supply management, does not. One of the unresolved issues is whether grain and livestock producers would be willing to give up or modify their programs if at the same time the supply-management system goes untouched? This question is particularly relevant if retention of supply management means, for example, that hog and beef producers in both eastern and western Canada will not be given access to the large Japanese market, or that lack of access to the Canadian market for EC poultry results in a continued overproduction of canola in that region through high price supports.

Summary

The changing structure of the world grain market and the high degree of protectionism in countries like the EC have resulted in a crisis in international agriculture. Protection adds to output, depresses world price, and heightens the degree of price and income instability for exporters. To deal with this crisis, the GATT has introduced negotiations aimed at liberalizing world trade in agricultural goods. At the heart of the proposals is an attempt to have the major grain-growing regions of the world adopt domestic agricultural policies that are market-oriented and non-trade-distorting.

While the changes proposed under GATT are highly desirable, there may be some difficulty in achieving them. It was pointed out that not all countries may benefit from such a move and may therefore be unwilling to agree upon a settlement. The failure of any one country or region that is a significant agricultural trader to join a GATT agreement would make the agreement almost completely ineffectual, since what is necessary for success is that all countries have assurance that the others will incur their share of the cost. An agreement may also be difficult to achieve since many of the parties do not agree on what the impact would be even if an agreement was successful.

For Canada, the problems associated with GATT centre on whether or not other countries will abide by potential agreements, on what programs must be given up to ensure an agreement, on whether those sectors who stand to lose under freer trade will have to be compensated, and on whether agreements that might be reached are viewed as fair from agriculture in the various regions of Canada.

The success or failure of GATT, however, does not mean Canada should not be continually re-examining its agricultural policies. The debt and income problems described in this study require a solution. While some of the programs outlined above are useful for dealing with this question, it is likely that other new initiatives will have to be developed. Programs like equity financing and additional debt review, for example, will be examined as possible ways out of the severe problems facing agriculture. As this is done, however, it is vital that Canada not add yet another layer of programs to its agricultural policy. Policy streamlining is one way of ensuring that agricultural policy will be effective over the long term, as well as making sure that although it is responsive, it does not respond to every ups and downs in the economic environment.

The agricultural policy chosen must provide effective stabilization to producers, since the short-run impacts of fluctuations in international markets can be very severe. However, in providing this stabilization, agricultural policy must ensure that it does not influence the expectations of the industry as to what lies ahead. The failure of agricultural policy to do this in the past is one of the reasons why Prairie agriculture faces a crisis in the 1980s.

Appendixes

A Multiplier Analysis*

Government expenditure in the form of a sectoral program is usually considered an income transfer from general tax revenue to the sector receiving the support. The multiplier analysis of the impact of government expenditure is, as follows:

According to the national income accounting identity,

$$Y = C + I + G, \tag{1}$$

where:

Y = national income;
C = consumption;
I = investment; and
G = government expenditure.

It is often assumed that consumption is a function of national income and that investment is a function of the interest rate:

$$C = \alpha_0 + \alpha_1 Y; \tag{2}$$

and

$$I = \beta_0 + \beta_1 r, \tag{3}$$

where r = interest rate. Taking r and G_0 to be exogenous, the multiplier of government expenditure is given by $1/(1 - \alpha_1)$.

The investment function of a sector like agriculture, with a large asset base, may not be solely a function of the interest rate; it may also include a wealth variable. For instance, wealth (W) could be included in the investment function by specifying

$$I = \beta_0 + \beta_1 r + \beta_2 W. \tag{4}$$

In the case of western Canadian agriculture, wealth is largely the value of farmland and capital assets (buildings and machinery). As Chapter 5 pointed out, economic theory suggests the value of those assets is a function of the income of the sector. Therefore, one can write wealth (W) as a function of income (Y):

$$W = \gamma_0 + \gamma_1 Y. \tag{5}$$

Thus the investment function in (4) can be rewritten as:

$$I = \beta_0 + \beta_1 r + \beta_2(\gamma_0 + \gamma_1 Y). \tag{6}$$

A multiplier for government expenditure with the system given by (1), (2), and (6), can now be computed:

$$Y = \alpha_0 + \alpha_1 Y + \beta_0 + \beta_1 r + \beta_2(\gamma_0 + \gamma_1 Y) + G,$$

or

$$Y = \frac{\alpha_0 + \beta_0 + \beta_1(r) + \beta_2\gamma_0}{1 - \alpha_1 - \beta_2\gamma_1}.$$

It can be seen from the above that the multiplier for government expenditure in this sector, $1/(1 - \alpha_1 - \beta_2\gamma_1)$ is greater than if wealth were not a function of income and if investment were not a function of wealth. The multiplier in the absence of these effects is given by $1/(1 - \alpha_1)$, as stated above.

The results are not surprising, since government expenditure on the farming sector is an income transfer, not only to consumers but also to an industry. Hence there will also be an investment effect as well as a consumption effect. Government expenditure – say, in the form of a deficiency payment – is essentially a change in income to that sector. In the case of agriculture, some proportion of that change in income will get capitalized into the value of farmland and, to a lesser extent, into the value of machinery and buildings.

In addition, if the marginal propensity to consume (α_1) is greater in the farming sector than the national average, the sectoral multiplier will be greater than the overall multiplier. It may be argued that lower income individuals have a greater marginal propensity to consume. It is generally accepted that the average farm income is less than the national average income.

---

*We would like to thank Julia Taylor for her assistance in the formulation of the material in this Appendix.

Table A-1

Calculation of Multipliers

	Parameters					
	$\alpha_1 = 0.75; \beta_2 = 0.05$		$\alpha_1 = 0.6; \beta_2 = 0.1$		$\alpha_1 = 0.55; \beta_2 = 0.1$	
	$\gamma_1 = 2.0$	$\gamma_1 = 3.5$	$\gamma_1 = 2.0$	$\gamma_1 = 3.5$	$\gamma_1 = 2.0$	$\gamma_1 = 3.5$
Wealth multiplier $1/(1 - \alpha_1 - \beta_2\gamma_1)$	6.67	13.33	5.00	20.00	4.00	10.00
No-wealth multiplier $1/(1 - \alpha_1)$	4.00		2.50		2.00	

SOURCE Based on calculations by the authors.

Table A-1 presents estimates of the government spending multiplier associated with various values of α_1, β_2, and γ_1. In particular, the marginal propensity to consume out of income (α_1) ranges from 0.55 to 0.75, the marginal propensity to invest out of wealth (β_2) is allowed to vary from 0.05 to 0.10, while the parameter γ_1 takes on values of 2.0 and 3.5.

In selecting values of γ_1, the discussion in Chapters 5 and 9 was used as a guideline. In Chapter 5, it was suggested that the ratio of the change in the value of agricultural assets to the change in agricultural income (i.e., γ_1) could be approximated by the ratio $1/(r - g)$, where r is the interest rate and g is the expected growth in income. Chapter 9 presented empirical data showing that, historically, this ratio has ranged from a low of 7.0 to a high of nearly 40.0. In order to present conservative estimates, values for γ_1 of 2.0 and 3.5 were chosen for the calculations in Table A-1.

The estimates presented in Table A-1 indicate that \$1 of government spending to the agricultural industry in western Canada could generate anywhere between \$4 and \$20 in total income for the economy, if the wealth effects are taken into account. If the wealth effects are not included, the multiplier reduces to somewhere in the range between 2.00 and 4.00.

There are other factors to be considered in addition to the multiplier effects. As a result of the crisis facing Prairie agriculture, a number of farmers and their families are under a great deal of stress. This has lead to suicides, attempted suicides, divorces and other stress-related effects. The impact of these in terms of human cost, loss of productivity, and medical cost, can be quite substantial. If a deficiency payment can help ameliorate some of these effects, then the spinoffs from this form of government spending are even larger than those presented in Table A-1.

If the deficiency payment were also taxable, up to one-quarter of the payment would be returned to the treasury in tax revenue. In addition, because of the multiplier effect discussed earlier, additional tax revenues would be generated through increased income. For example, if the multiplier effect is 4.0 and the tax rate is 20 per cent, \$800 million would be generated in tax revenue.

As can be seen from the above, there may be benefits from commodity programs that are overlooked using the standard supply-and-demand analysis. A first approximation of the magnitude of those benefits indicates that they could far exceed the treasury cost. Further investigation is necessary, however, to achieve a complete economic analysis. The introduction of the wealth component of the investment function is an innovative idea in the calculation of multiplier effects. Also, the economic analysis of medical costs is becoming increasingly important, as the social and health budget of Canada is continually expanding.

What is also needed in doing multiplier analysis is to trade out the dynamic effects, since the multiplier effects in boom periods may be greater than in bust times. For example, in the mid-1980s, a substantial percentage of the government transfers was being used to pay the principal and interest on outstanding debt. The money received by farmers under such circumstances does not generate large multiplier effects. Perhaps the largest multiplier effects occur during a period when new borrowing is taking place.

B Market Dynamics, Expectations, and Asset Values

The markets for the major Prairie agricultural products are highly unstable and often cyclical, in that prices may rise for several years in a row and then decline for an extended period. When product markets are unstable, input markets also become volatile. Market uncertainty, coupled with cyclical behaviour, poses a dilemma for policy makers because these phenomena can bring about, in certain periods, an overcapitalization of agriculture.

I

Consider the early 1970s, when grain prices were depressed but the livestock industry was reasonably buoyant. Because of several events, including poor harvests worldwide, the grain market rose sharply between the 1972/73 and 1973/74 crop years. As a result of the rise in grain prices, the red-meat sector began to experience financial difficulty. The relative price change encouraged expanded wheat production, while red-meat production contracted.

To illustrate the effects of rapidly rising grain prices, consider Chart B-1, where S is the supply curve for Canadian wheat and D_d is the Canadian demand curve. At an international price of p_w, Canada exports Q_1Q_2. Given a rise in world price to p'_w, Canadian exports increased to q_1q_2, and total output expanded from Q_2 to q_2.

The effect of the price increase was not only to increase output; economic rents (or the return to fixed factors of production such as land) also increased. The economic rent accruing to the agricultural sector at price p_w is $p_w ab$. With a price rise to p'_w, rents increase to $p'_w cb$ where the net increase is the area $p'_w cap_w$.

Consider the effect of the price rise on the largest fixed input in agriculture – namely, land. In Chart B-2, the supply of land is S_L, while D_L is the derived demand curve for land for a world wheat price of p_w. The land price is p_L. With an increase in the price of wheat to p'_w from p_w (see Chart B-1), the derived demand curve for land shifts to D_L' causing the price of land to rise to p_L'. The increase in the rent to land because of the price rise is the area $p_L'abp_L$. Under competitive conditions elsewhere in the economy and perfectly elastic supply conditions for all non-land inputs, the area $p_L'abp_L$ (Chart B-2) equals area $p'_w cap_w$ (Chart B-1).

Chart B-1

Effect of an Increase in the Price of Wheat

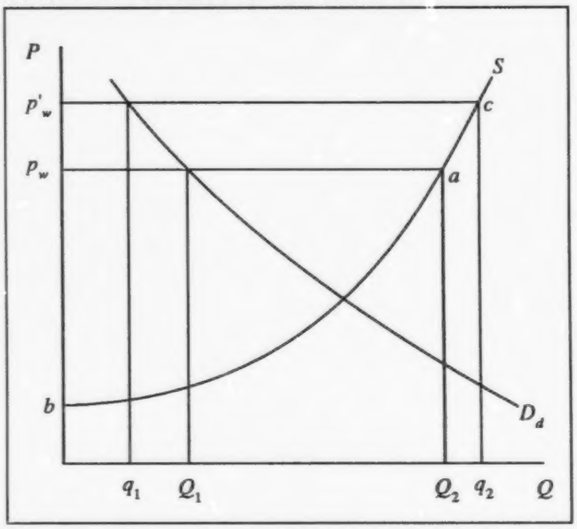
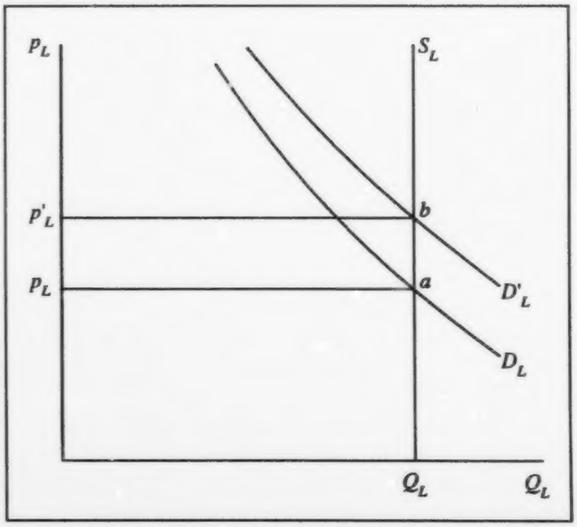


Chart B-2

Increased Demand for Land as a Result of a Higher Wheat Price



Viewed in the context of an ever-changing market situation, the rents illustrated in Charts B-1 and B-2 will accrue only if producers view the commodity-price increases as permanent. The effect of temporary price changes are illustrated in Chart B-3. The supply curve of wheat is *S*, and prices fluctuate between p_1 and p_2. The producers' expected price is p_e, with the corresponding rent of $p_e ab$. With a price increase to *P*, rents do not rise, since the expectation is that price will not remain at that level. In the 1970s, however, grain producers did not have that type of price expectation in mind. Rather, they believed that grain prices were exhibiting short-term fluctuations around an upward trend. Given those price expectations, producers, after several years, viewed the price rise of the early 1970s as permanent. That gave rise, with a lagged response to rising prices, to a rapid increase in asset capitalization. Farmers bid up the price of land according to the model in Chart B-2, since price increases were viewed as permanent. Notice, however, that to sustain land values at those high levels, wheat prices would have had to remain at a level like p'_w in Chart B-1.

Another major influence on the capitalization process in agriculture was the rapid rise in inflation in the 1970s. In the presence of inflation that is expected to continue, people buy farmland as a hedge. The result is a further shift to the right (i.e., beyond D'_L) of the derived demand curve shown in Chart B-2. The effect of inflation is illustrated in Chart B-4. The derived demand curve caused by inflation is D_i. If that derived demand curve is added to D'_L – the demand for land as a result of higher commodity prices – the result is a total derived demand schedule D_L^T. In that case, the added rent because of the price increase is area $p'_L bap_L$, while the rent resulting from inflation is area $p''_L cbp'_L$. These two effects generate an increase in aggregate rents of $p''_L cap_L$. Thus if inflation continued, a fall in wheat prices back to p_w (Chart B-1) would still give rise to an increase in net rents.

Because of the nature of the behaviour of grain prices in the 1970s and because some producers viewed the price rises as permanent, resources left the livestock industry (e.g., increased cultivation of pasture land), and the Prairie region increased its specialization in grain production (as shown in Chart B-5). When the ratio of livestock prices to grain prices is *p*, the amount of grains and livestock produced is *G* and *L*, respectively. If, however, the relative prices change in favour of grains and the price change is viewed as permanent, resources will shift into grain production. For example, at a relative price of *p'*, the output of livestock is reduced to *L'*, while grain output is increased to *G'*.

Chart B-3

Rents and Expected Rents as a Result of a Change in the Price of Wheat

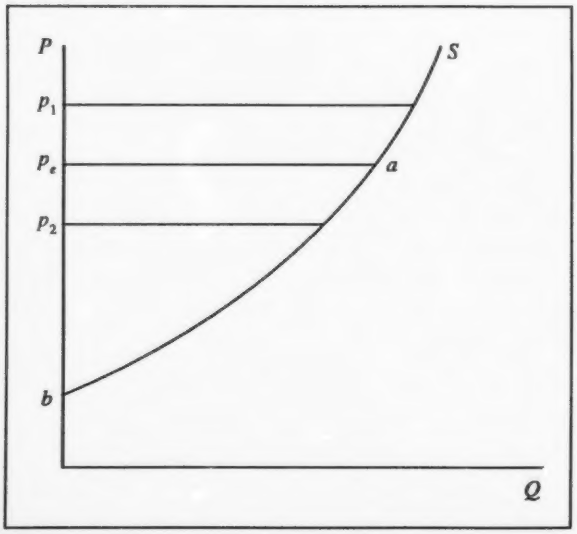


Chart B-4

Increased Demand for Farmland Because of Inflation

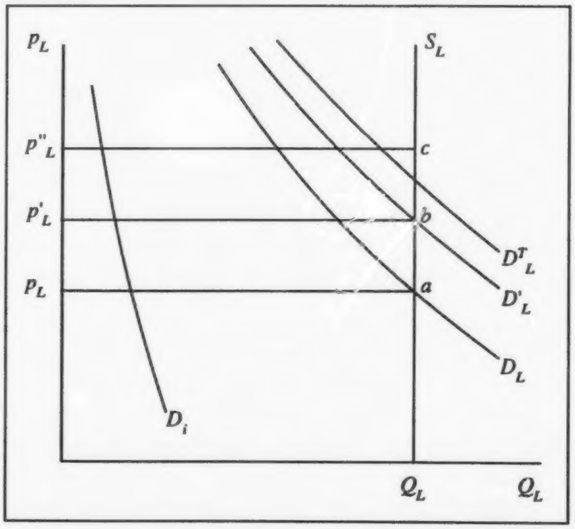
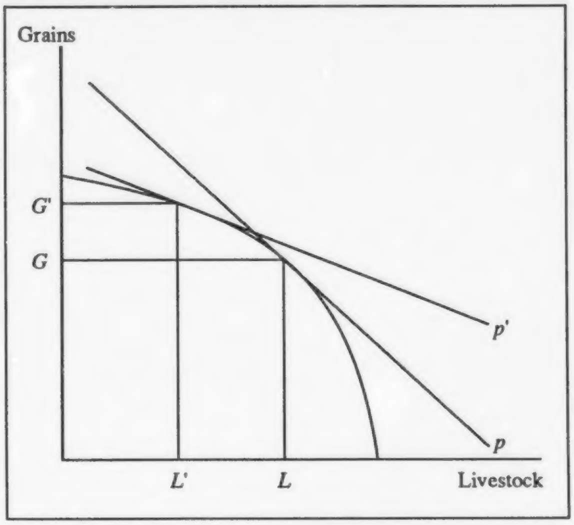


Chart B-5

Effect of Relative Price Changes on Grain and Livestock Production in the Prairie Agricultural Sector



II

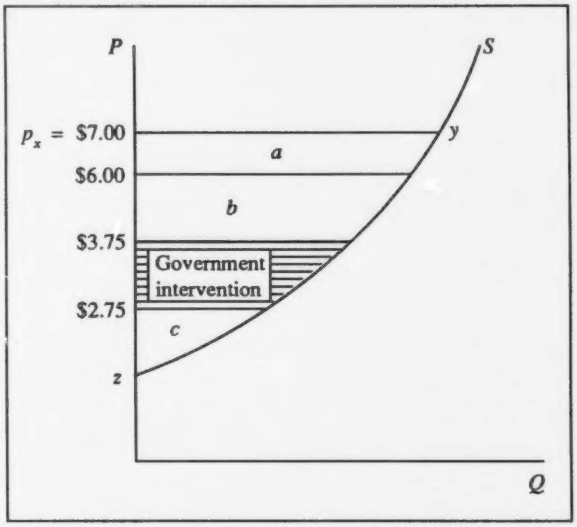
The period of the mid- to late 1980s can be contrasted with the 1970s. Inflation had subsided, real interest rates rose, and grain prices were at an all-time low. Unlike the grain sector, the red-meat industry was generally more profitable than it was during most of the 1970s. In the process of adjustment to lower inflation rates and lower grain prices, economic rents have been eroded, even with government programs in place. The overcapitalization of agriculture brought about by the forces in the 1970s cannot be sustained. For instance, it is clear from Chart B-4 that if governments had not intervened when grain prices declined and inflation subsided, rents in the amount of $p''_L cap_L$ would flow out of agriculture.

Not all producers participated in buying farmland during rising prices. In a falling land market, these farmers are affected in that their wealth is eroded and their income is reduced because of lower commodity prices. Those producers who participated in the high-priced land market, however, are affected in an additional manner: they have to make payments on assets whose values are much lower than when purchased. With a sharp drop in commodity prices, a debt crisis emerges, since the income generated on the farms that are highly leveraged cannot finance the debt. What is often referred to as "the debt crisis" occurred because agriculture became overcapitalized: one of the major inputs, land, was overpriced.

How does government policy fit in? As the text of this study shows, sizeable government transfers were made to Prairie farmers in the 1980s. To realize their importance, consider Chart B-6, where the role of government policy is introduced, along with the overcapitalization phenomenon. The supply curve for wheat is *S*. If the actual price of wheat was $6.00 per bushel, the price with inflation and with the price expectations on which land-purchase decisions were based may well have been $7.00 per bushel. The rent expected during that time was $p_x yz$.

Chart B-6

Effect of Government Policy Intervention on Rents in the Prairie Agricultural Sector



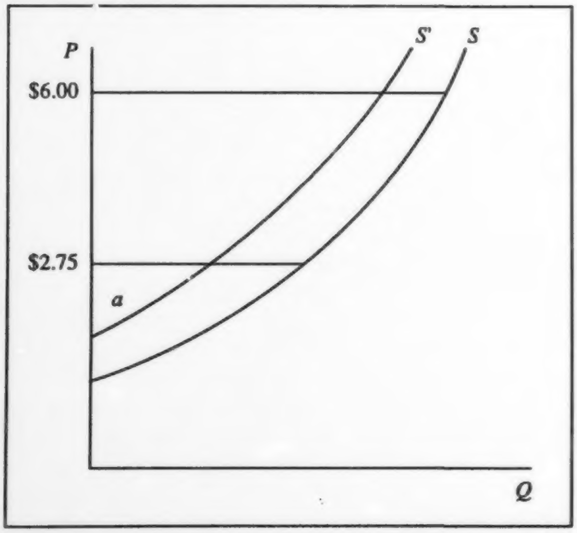
At the beginning of the 1987/88 crop year, wheat prices were below $3.00 per bushel, and inflation had subsided. Thus without government intervention, only area *c* would have remained. What is the effect of government policy? Suppose that as a result of the WGSA program, cash advances, and deficiency payments, the transfers from the federal government were roughly $1.00 per bushel; that would raise the total price to $3.75 per bushel. Thus the loss in rent to the agricultural sector is reduced by the shaded area as a result of government policy. The actual loss after netting out the government influence, however, is still large (the area between $3.75 and $7.00 per bushel bounded by the supply curve *S* – i.e., area *a* + *b*). From Chart B-6, it is apparent that the net impact of government policy in an overcapitalized industry can be small relative to the overall impact of both falling commodity prices and inflation.

The picture shown above is not entirely correct, however, since it assumes that a dollar transferred from the government to producers has the same effect on rents as does a dollar from the market place. In the study by Schmitz et al., it is shown that producers may discount government programs when making purchases of capital assets such as land.[1] Consequently, the loss in economic rent may be larger than area *c* + *b* in Chart B-6, even in the presence of government programs of the magnitude illustrated. As a result, the dynamic path of changing net Prairie farm incomes does not track the path of changing asset values. As Schmitz et al. show and as is pointed out in the text, net farm income in the Prairies was relatively stable during the late 1970s and early 1980s. Asset values, on the other hand, were very volatile.

During the 1970s, the price of non-land inputs such as fertilizer, chemicals, and farm machinery also rose sharply. The effect of that price rise is shown in Chart B-7. Because of the rising input costs, the supply curve shifts from *S* to *S'*. Thus the price of wheat would have to rise above $6.00 per bushel in order to sustain the rent generated at $6.00 under the initial supply curve *S*. If the price should stay at $6.00 per bushel, however, there would be a loss in rents of the shaded area because of rising input costs. If the price fell from $6.00 to $2.75 per bushel, the rents of area *a* are all that would remain. Thus the farm crisis is made worse than first illustrated, because part of the rents are dissipated, not only because of falling prices and a reduction in inflation but also because of rising input costs. A major factor in the increase was the rapid rise in interest costs in the 1980s, when the real rate of interest rose sharply.

Chart B-7

Effect of Rising Input Costs on Rents in the Prairie Agricultural Sector



III

In the latter part of the 1970s and early 1980s, bankers generally lent money based on perceived individual farm wealth rather than on projections of net cash flow and the ability to service debt.[2] In the late 1980s, however, lending began to be based on an evaluation of debt-servicing ability and cash-flow projections. The lending practices of the earlier period may have added to the problem, since lending based on the notion of net wealth can attract too much money to the agricultural sector. In terms of Chart B-6, the wealth phenomenon was based on wheat prices of $8.00 to $10.00 per bushel, whereas lending based on market prices would have been based on a $6.00 figure or less. Note than even at $6.00 per bushel, the cash flow for most wheat budgets would be insufficient to cover payments on land purchases made in the early 1980s.

IV

European farmers and those in the United States have, over a long period of time, received higher subsidies from government than have Canadian farmers. Farming in those countries has often been perceived as being more profitable than in Canada. Policies are quite different among countries. For example, unlike in Canada, EC prices are relatively stable and are generally supported above world market levels. The difference in price patterns that are generated by policy can influence producers' price expectations, making boom-and-bust cycles more acute for Canadian producers. The actual prices in Canada rise and fall much more quickly than in the EC. In addition, in terms of the impact of government programs on asset values, there is a difference between the two regions: unlike in the EC, Canada's major programs for Prairie agriculture originated only recently (as indicated in the main text of this study). It is hypothesized that asset values fluctuate to a greater degree in Canada than in the EC.

C A Theoretical Analysis of Canadian Agricultural Policy

"Policy" can be defined as the goals and objectives of government (federal and/or provincial) – in short, the philosophy that the government has towards agriculture. The notion of policy can perhaps best be captured by the question, "What is being maximized (or minimized)?" A list of some of the answers include: the number of farmers; the income of farmers; the wealth of farmers; the price of food (minimization); the profits of the multinational equipment and chemical producers; the amount of soil being lost; or the amount of soil being conserved. In the formal and theoretical economic analysis presented below, policy refers specifically to the weights that the government implicitly or explicitly attaches to the welfare of producers, consumers, taxpayers, the bureaucrats, and so on. In general terms, however, agricultural policy can perhaps be more aptly regarded as indicative of the importance placed by the government on anything or anyone that has any relation to Canadian agriculture.

Care must be taken to distinguish policy, or policies, from programs, the latter being ways or methods by which to achieve the goals that have been identified. The distinction between the two is important. Policies, by their very nature, imply a weighting or trade-off between the interests of various groups in the agricultural economy. As such, a policy, if correctly defined, cannot be in conflict, since if the government chooses to place twice as much weight on the welfare of group X as on that of group Y, then that is its policy.

While an individual policy cannot be in conflict with itself, one policy can be in conflict with another. For instance, the government's soil policy might be in conflict with its farm-income policy. In such a situation, the overall agricultural policy of the government is said to be undefined, since the weights that the government attaches to the various players in the industry have not been clearly specified. The different goals of the various levels of government and of the departments within government represent a major source of policy conflict.

Programs, like policies, can also be in conflict. The conflict is of a different nature, however, since if it exists, it arises from the fact that an attempt to fulfil one or more objectives may inadvertently have the effect of contributing to, or detracting from, other objectives. Thus while a policy, at least theoretically, can be made internally consistent, it is not at all certain that programs can be made to be so. Even in the absence of policy conflict, therefore, it is likely that the programs that have actually been implemented will be in conflict.

The notion of policy being based on government welfare weights and objectives says nothing about how those weights and objectives are established. Traditionally, the view was that the government, acting as a disinterested and enlightened party, decided upon the weights according to what it felt was best for society. Thus policy was seen as a way to increase the welfare of all groups in society; in short, the government was thought not to play favourites.

Increasingly, however, that view of government has been challenged. Indeed, the view that prevails now is that government is routinely "captured" by interest groups who are organized around some common goal or economic enterprise and who lobby the government in order to get programs implemented that are beneficial to them. That is known as "rent seeking."

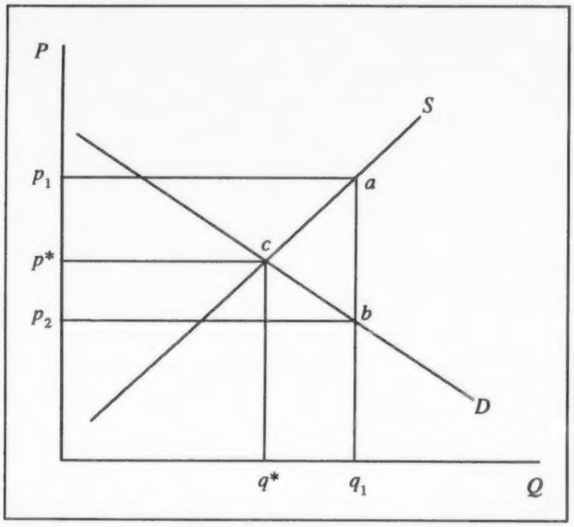
Despite the alteration in the view as to how policy weights are established, the notion of policy being based on the weights or objectives attached to various groups in the economy remains useful, however. Indeed, under the rent-seeking theory, interest groups, through their lobbying efforts, are seen as being the driving force that determines why one particular group may have a large and positive weight attached to its welfare by the government.

Policy and Welfare Weights

The notion of policy as the weight that government attaches to the welfare of the various groups in society plays a central role in theoretical policy analysis. Consider as an example Chart C-1, which illustrates the supply (S) and demand (D) curves for an agricultural commodity. If the market for that good is perfectly competitive, the resulting price and output will be determined by the intersection of supply and demand – in this case, at price p^* and at quantity q^*.

Chart C-1

Canadian Agricultural Policy Analysis and Welfare Weights



The same outcome can be derived in an alternative manner. Utilizing the concepts of producer surplus (the area above the supply curve and below the price line) and consumer surplus[1] (the area below the demand curve and above the price line), what price and outcome would give rise to a maximum level for those two values? In asking that question, however, the problem immediately arises as to what weight to attach to each measure. Are they to be weighted equally, so that what is being maximized is the sum of the two values, or should one be given more weight than the other? Of course, that question is tantamount to, "What weights should be attached to the welfare of producers and to the welfare of consumers?"

A standard result of welfare economics is that maximizing the sum of producer and consumer surplus will give rise to the competitive equilibrium, p^* and q^*. In other words, attaching equal weight to the welfare of producers and consumers will result in an outcome that is identical to the competitive equilibrium and that shares all the properties of a competitive equilibrium, such as efficient resource allocation and zero deadweight welfare losses.

It must be made clear, however, that attaching equal weight to the welfare of producers and consumers is a value judgment. Thus if the government decides to accept, or encourage, a competitive equilibrium, it will be explicitly making a value judgment that the welfare of consumers is equal to that of producers. In other words, the government will have made a policy decision. Of course, the government could have decided to attach a greater weight to one or the other of the two groups. In fact, in most cases, there are more than two groups whose welfare must be weighted. Since the government has the ability to impose taxes, one important group would be the taxpayers. Other groups might include consumers of different products, the producers of different products, or different-sized producers within a particular product grouping.

For instance, suppose there were three distinct groups in society – consumers, producers, and taxpayers. Suppose also that government decided that the welfare of producers and consumers would be weighted higher than the welfare of taxpayers. One way to achieve that might be to guarantee producers a price of p_1. Faced with a price of p_1, producers would produce output q_1. In order for consumers to purchase that amount of the commodity, the price of it to them would have to be lowered to p_2. The difference between price p_1 and p_2 would then be paid to the producer by the government. The revenue that would enable government to make that payment would have come from the taxpayer.

Under that scheme, producers would experience an increase in welfare over the competitive case equal to area p_1acp^*, while the welfare of consumers would increase by area p^*cbp_2. On the other hand, the welfare of taxpayers would fall by area p_1abp_2. Thus the government's policy decision to attach greater weight to the welfare of producers and consumers would be reflected in an increase in their welfare, while taxpayers would see a reduction in theirs.

By assuming equal welfare weights for all groups, economists would conclude that in the above situation, resources were being used inefficiently, since too much of the good was being produced. They would calculate the net welfare cost to be area *abc* and would conclude that the situation was at odds with a freely functioning market. Because the government viewed that program as desirable, however, the area *abc* should be correctly viewed as the extra resource costs needed to bring about the desired result. By definition, there can be no net welfare cost. The different welfare weights underlying the policy choice imply an outcome that is not equal to the perfectly competitive outcome. Given these welfare weights, the objective should be to ensure that if transfers are to be made, the cost should be kept as low as possible. In Chart C-1, this implies that *abc* should be small relative to transfer p_1abp_2.[2]

The importance of this discussion of welfare weights is that policy makers might wish to transfer income from one sector of the economy to another. In such situations, one of the objectives in choosing a program should be to ensure that the costs of making the transfer are kept to a minimum. For instance, implicit in the discussion of "decoupling" is the view that income transfers can be made without incurring any costs. In other words, if a program is decoupled, income transfers can be made without distorting resource allocation. As discussed in Chapter 10, however, there is reason to believe that decoupled programs are not possible and that all programs involve some degree of resource misallocation. The theoretical discussion above acknowledges this and points out that if transfers are to be made, the costs of those transfers must be kept as low as possible.

Several other points should be examined with regard to the above example. It was noted earlier that the producers would experience an increase in welfare equal to area p_1acp^*. In formal terms, that is the *subsidy* that producers receive. In other words, although producers receive a much larger amount from government, equal to area p_1abp_2, that is not the subsidy because, compared with what they would have received had the government not been involved, only area p_1acp^* is extra. Area p_1abp_2 could be more correctly defined as the transfer that takes place between taxpayers and producers. Note also that while the consumers are receiving a subsidy equal to area p^*cbp_2, no direct transfer is being made to them from the government. The gain to consumers comes about because of lower prices. Thus, as this example points out, subsidies can be made without transfers taking place, and even when transfers are made, they are often not the same as the level of subsidy.

Formal Policy Analysis

The above framework is used to analyze the programs affecting Prairie agriculture. The remaining sections will attempt to analyze specific agricultural programs by examining the impact that they have on the supply and demand curves of the various agricultural commodities and the numerous inputs that are produced and utilized in the Prairies. By examining how these demand and supply curves shift in response to the programs, some indication of who wins and who loses from a program can be determined. In addition, this framework allows for an examination of the degree to which particular groups are being subsidized or are the recipients of income transfers.

The *Western Grain Stabilization Act*

The *Western Grain Stabilization Act* (WGSA) was introduced in 1976 in an attempt to provide some stability to the Prairie grain region. The program was the culmination of discussions emanating from the 1969 Federal Task Force on Agriculture, which recommended that a stabilization program be established to replace the then current set of existing ad hoc programs.[3]

Until WGSA was modified in 1988, producers who were enrolled in the program contributed a levy of between 1 and 3 per cent of gross sales, up to a maximum of $60,000 in gross sales. The producer levy was matched by a levy from the federal government, which also contributed a flat 2 per cent of gross sales. Under the modifications announced in 1988, the producer levy will range between 2 and 4 per cent, and the government's contribution will continue to be 2 per cent higher than that levy.

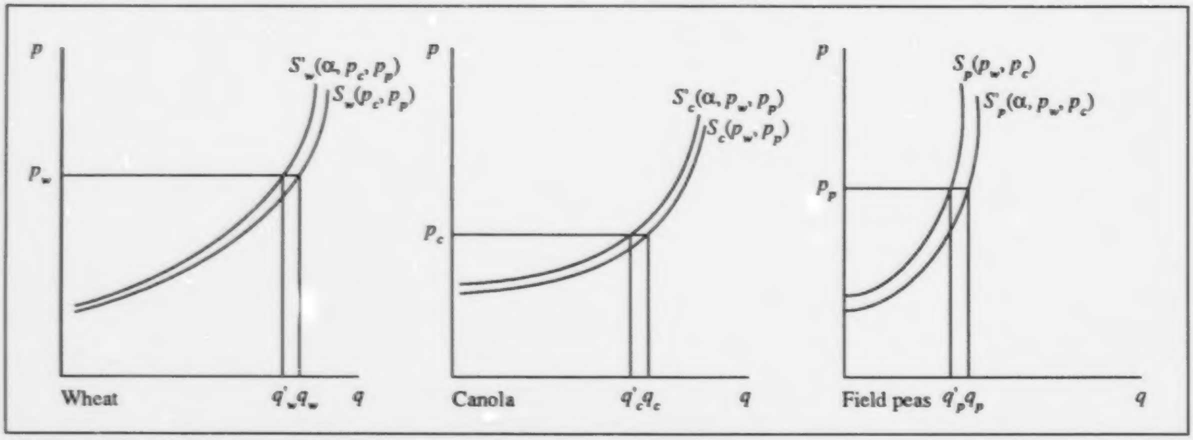
Payouts are made under the program in any year that the net cash flow of the western grain-growing region falls below the average of the preceding five years. The program applies to grains and oilseeds that move commercially, are sold for export, or are sold to designated purchasers in western Canada. The grains and oilseeds that were eligible under WGSA before the 1988 changes were wheat (including durum), barley, oats, rye, flax, canola, and mustard. The crops added in 1988 were triticale, mixed grain, sunflower seeds, safflower seed, buckwheat, peas, lentils, faba beans, and canary seed.

In examining the impact of WGSA, the supply curves for the production of wheat, canola, and field peas in the Prairies are shown in Chart C-2. The supply curves for wheat and peas are assumed to be very inelastic; the curve for canola is somewhat more elastic. It is important to note that the shape and position of the supply curve of one crop will depend upon the price of all the other crops. For instance, the supply curve for wheat will shift upward and to the left when the price of peas and/or canola increases. In other words, an increase in the price of canola has the effect of raising canola production and decreasing wheat production. A similar change would occur in the supply curve of canola if the price of wheat were to change.

The impact of WGSA on the level of output produced in the Prairie region will depend upon whether agriculture is experiencing relatively good times or relatively bad times. Intuitively, that makes sense, since the main goal of WGSA is to provide stability to a highly volatile and uncertain Prairie agricultural industry. Consider, for example, the situation when grain prices are relatively high. During periods of high grain prices, farmers would not expect a payout from the WGSA, although they would have to continue contributing levies to the program. Since levies are based on gross production, the impact of WGSA would be to reduce the price of grains eligible under the program

Chart C-2

Effect of WGSA on Prairie Crop Production When Crop Prices Are High



by the amount of the levy, while the price of non-eligible crops (such as peas and lentils prior to 1988) would not be affected.

That can be illustrated as follows. If p_w, p_c, and p_p are the prices of wheat, canola, and field peas, respectively, and if q_w, q_c, and q_p are the corresponding quantities, then the profits (Π) earned by a farmer could be stated as:

$$\Pi = p_w q_w + p_c q_c + p_p q_p - \alpha(p_w q_w + p_c q_c) - c(q_w) - c(q_c)$$

$$- c(q_c),$$

where α is the level of the WGSA levy (e.g., 1 to 3 per cent) and $c(q_i)$ is a cost function for the i^{th} crop ($i = w, c, p$). Note that the equation above reflects the situation prior to the summer of 1988, since field peas were not eligible under the program and thus did not have a levy assessed against them.

The equation could be rewritten as:

$$\Pi = p_w(1 - \alpha)q_w + p_c(1 - \alpha)q_c + p_p q_p - c(q_w) - c(q_c) - c(q_c).$$

The impact of WGSA can thus be examined by introducing α into the supply curves for each of the crops. Increasing α from zero to a positive number will shift the supply curves for wheat and canola up and to the left, while shifting the supply curve for field peas down and to the right (Chart C-2). Thus during relatively prosperous periods, the impact of WGSA, from a theoretical perspective, would be to increase the production of grains not eligible under the program (e.g., pea production from q_p to q'_p), while reducing the output of grains that are eligible (e.g., wheat production from q_w to q'_w and canola production from q_c to q'_c).

How important, from a quantitative point of view, are these changes likely to be? The answer would appear to be, "Not very." There are at least two reasons why that is likely to be the case. The first is that when prices for wheat and canola are relatively high, farmers are not likely to shift into a new crop such as peas simply because the prices of the more traditional crops have declined by α per cent, considering that α ranges between 1 and 3 per cent. In other words, if wheat and canola are the more profitable crops to grow when the price is at a level like p_w or p_c, then a small decline in those prices is unlikely to make them suddenly unprofitable. Thus it is unlikely that large acreages would be shifted from crops like wheat and canola to pea-type crops. It should be noted that the changes to WGSA announced in 1988 will further ensure that the output effect is small. The addition of specialty crops to WGSA means that in periods of relatively high prices, the impact of the levy will be to change all prices by the same percentage. With no change in relative prices, crop production is unlikely to change to any great extent.

The second reason is that only those farmers who have gross receipts of less than the $60,000 maximum will actually experience a relative price decline for wheat and canola. For those producers, the price of wheat or canola, less the levy of α per cent, represents the marginal revenue from producing an additional bushel of those crops. For the farmer who has surpassed the $60,000 limit in gross sales, however, the marginal revenue would be just the price of wheat or canola, since on the last bushel produced, the farmer would effectively have received the full price of the grain, not the price less the levy of α per cent.

When the two factors outlined above are combined, it would appear that WGSA will have little impact on the relative levels of production during periods in which prices are relatively high. That, however, might not be the case when low-price periods are examined. To be more specific, WGSA may increase the production of the crops eligible under the program during periods when the price is dropping rapidly.

When prices are falling, a payout from the program becomes much more likely. The level of payout for each farmer is determined by multiplying his or her share of the payout by the total value of the payout. The total value of the payout is determined by calculating the difference between the net cash flow of the western region this year and the average of the preceding five years. The farmer's share of that value is determined by comparing the amount the farmer contributed in levies this year and in the previous two years with the total levies of all farmers over the same period.

The effect that this has on the effective price that farmers receive can be seen by examining the returns the farmer would get for one of the crops, say wheat, if he or she were enrolled in WGSA. Denoting TVP_t as the total value of the WGSA payout expected in period t, and TL_t as the total levies contributed by all farmers in period t, the profits of a farmer growing wheat could be expressed as:

$$\Pi_t = p_t q_t - \alpha p_t q_t + \frac{\alpha p_{t-2} q_{t-2} + \alpha p_{t-1} q_{t-1} + \alpha p_t q_t}{TL_{t-2} + TL_{t-1} + TL_t}$$

$$TVP_t - c(q_t) ,$$

where p and q are the price and quantity of wheat at time t. When the possibility of a payout is fairly high (i.e., $TVP_t > 0$), then the effective price that the farmer would receive for wheat becomes

$$p_t(1 - \alpha + \frac{\alpha}{TL_{t-2} + TL_{t-1} + TL_t} TVP_t) .$$

Thus in those years when farmers believe that a payout is likely, it would pay them to increase their levy – by increasing their acreage or yield of eligible crops – in order to increase the payment they will receive. That, of course, will only happen if a farmer is below the maximum levy of $60,000. When crop prices are low, however, the number of acres that a farmer can seed and still be under the maximum will increase. Nevertheless, the levy ceiling does restrict the degree to which some farmers can expand production in an effort to maximize their individual gains from the program.

Another factor may also limit the degree to which farmers will increase their acreage. In order to take advantage of payouts under WGSA, farmers would have to change their crop rotations. For instance, they might have to revert back to growing wheat, barley, or canola instead of field peas, or they might have to decrease the amount of summer fallow. Changing rotation involves a cost. For example, decreasing the amount of summer fallow will increase returns today but could decrease returns tomorrow because of a lack of moisture. Thus farmers might be hesitant to change their crop rotations in order to take advantage of a WGSA payout if it meant that they would be imposing future costs on themselves.

With these notions in mind, the impact of WGSA during periods of rapidly falling prices is illustrated in Chart C-3. Assuming that WGSA is not in place, the supply curves for wheat, canola, and field peas are S_w, S_c, and S_p, respectively. The introduction of WGSA has the effect of shifting the supply curves for wheat and canola downward and to the right; the supply curve for field peas shifts upward and to the left. The degree to which these curves shift (if they shift at all) will depend upon the size of the expected payout, the number of farmers that are below their maximum levy, and the cost of disrupting their crop rotations. From a theoretical perspective, the magnitude of this shift is not known.

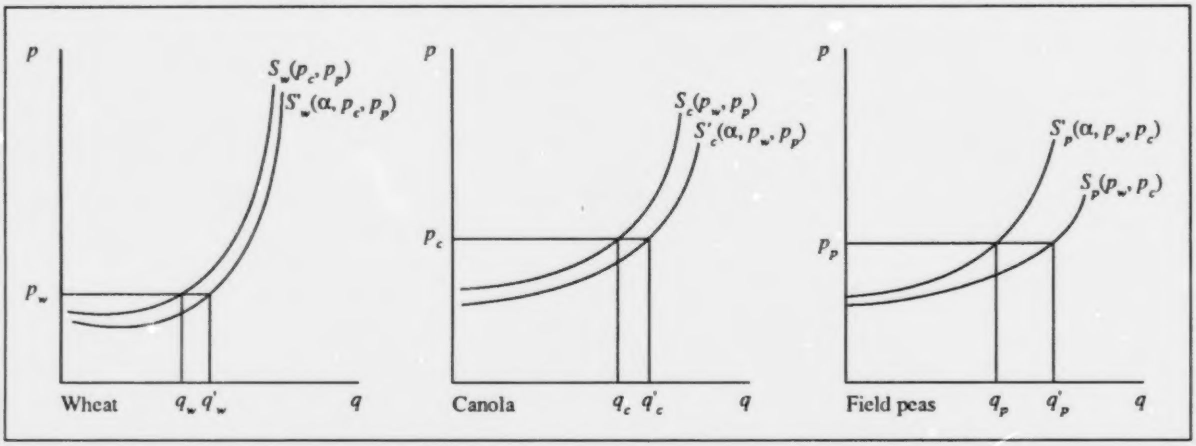
There is an important point to the above analysis – namely, that WGSA is essentially a "buffer fund" meant to achieve stabilization. The standard literature discusses stabilization in terms of physical storage. For Canada, physical storage of a crop would not affect world prices a great deal; that reduces the incentive for storage somewhat, since farmers can see no immediate benefit to commodity storage. Even for a relatively small country like Canada, however, there should be gains to storage if prices are expected to rise in future periods. Thus the ideal policy would likely involve a combined storage and buffer-fund scheme. Buffer-fund schemes have also been common in the Prairies for red-meat production. In that case, physical storage is impossible. As shown elsewhere, there are net gains from using buffer-fund arrangements for red meats.[4]

Crop Insurance

Crop insurance is a joint federal-provincial program, the details of which differ between provinces. In Alberta, Saskatchewan, and Manitoba, producers pay one-half of the insurance premium, and the federal government pays

Chart C-3

Effect of WGSA on Prairie Crop Production When Crop Prices Are Low



the other half, while the provincial governments pick up the administration costs for the program in their respective provinces. The crops covered in 1988 were listed in Chapter 7 for each of the Prairie provinces.

The insurance offers coverage against losses caused by any natural hazards, including drought, floods, frost, fire, wind, insects, and plant diseases. The premiums vary by region and crop, depending upon the risks involved, and have been calculated to be actuarially sound, given the payments by government, over a long-term period. Premiums also vary according to the level of coverage[5] chosen by the producer. Premium discounts are given to individual participants the lower the frequency of their claims.

The major effect of crop insurance is to reduce the uncertainty associated with the production of grains and other crops in the Prairies. At the minimum, this implies that producers faced with poor or lost crops as a result of natural causes will not see their gross receipts and incomes fluctuate, as they would in the absence of such a program.

That can be illustrated graphically. Chart C-4 presents supply curves for wheat, canola, and field peas for the Prairie region. The curves S_w, S_c, and S_p are *ex ante* or expected supply curves, for they indicate the expected production of each crop at specific prices. Actual production, however, will differ from expected production because of such factors as weather and insects. For instance, while expected wheat production may be shown as S_w, actual or *ex poste* production may be S'_w in a year when grasshoppers are bad or drought occurs, and S''_w in another year when rainfall is plentiful and conditions are otherwise good. In the absence of crop insurance, farmers would see their incomes from wheat production fluctuate between $p_w q'_w$ and $p_w q''_w$. Similar fluctuations would occur in their incomes from other crops.

Crop insurance can be seen as an attempt to reduce those fluctuations by using the revenues from the good years to provide insurance for the bad years. To the extent that crop insurance is successful in reducing the risk associated with production, however, it could be expected that an increase in production will occur. Consider again the supply curves in Chart C-4. Those curves are drawn on the assumption that farmers will apply a certain level of inputs such as fertilizer and pesticides. If weather and other conditions are good, then given that level of inputs, more output will be forthcoming; the opposite will be true when farming conditions are poor.

What determines the level of inputs that will be applied? Clearly that decision is affected by the amount of production risk that is perceived. Suppose that farmers limit the amount of fertilizer they use. In such a case, the expected or *ex ante* supply curve might be drawn as the curve S_1 in Chart C-5. If farmers increase the amount of fertilizer applied, the expected supply curve shifts to S_2. Notice, however, that increasing the amount of fertilizer not only increases expected production; it also increases the variability of production. In other words, with more fertilizer being applied, crop yields will be much better when weather and other conditions are favourable but also much worse when conditions are not favourable. That can be seen graphically by comparing S'_1 and S''_1 with S'_2 and S''_2.

Chart C-4

***Ex Ante* Supply Curves for Wheat, Canola, and Field Peas in the Prairie Provinces**

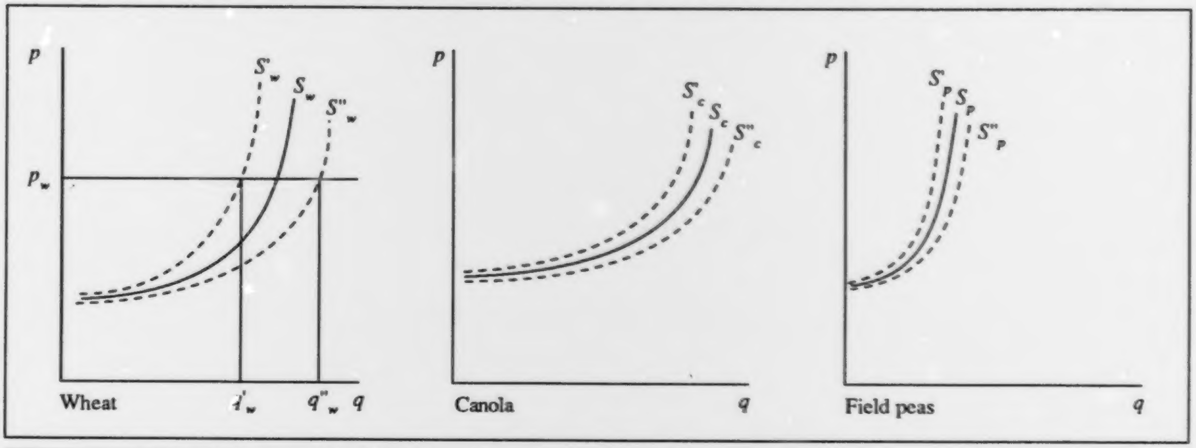
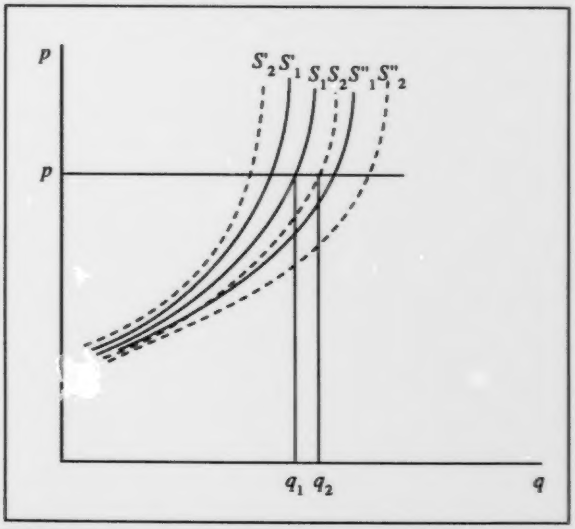


Chart C-5

The Effect of Crop Insurance on Expected Output in the Prairie Provinces



If crop insurance is not in place, farmers may decide to play it safe and use relatively less fertilizer; although doing so will reduce expected yield and expected profits, the farmer may prefer that, if it is combined with less chance of a poor crop. With crop insurance in place, however, producers may discount the possibility of bad years, arguing that should they occur, crop insurance will take effect. Such behaviour by all farmers would, of course, result in increased production, on average. That is illustrated in Chart C-5, where at price *p*, expected output is greater under crop insurance (q_2) than it is when crop insurance is not in place (q_1).

Production can also be expected to increase, for another reason. Since the federal government matches the producers' premiums one for one, the implication is that crop insurance is more than just insurance – it is a form of income transfer. The result is that bad years can be expected to be further discounted, with the result that the *ex ante* supply curve under crop insurance is again further below and to the right of the *ex ante* supply curve that would exist in the absence of crop insurance.

The analysis above assumes that farmers always prefer more income to less and that they are willing to work in order to obtain it. For some farmers, however, there is a trade-off between income and the ability to do other things on or off their farm. If crop insurance enables those farmers to earn the same level of income as they did before but in a less risky fashion, then they might be willing to give up some income in order to have the time to do something else. In such cases, the effect of crop insurance would be to reduce, rather than increase, the level of production.

The discussion above has focused on a single crop. Where farmers have the ability to grow more than one crop, the question of what happens to the output of each of the crops becomes difficult to determine. For instance, it might be expected that if crop insurance reduced the risk associated with some of the riskier crops such as field peas, the output of those crops would increase. That is not necessarily the case, however. For most farmers in Saskatchewan, the adoption of new crops in their rotations would be an extremely risky endeavour, involving not only riskier production but also new techniques and new capital equipment. The cost of adopting the technology necessary to produce those crops is often prohibitive. Crop insurance will only be a factor causing farmers to shift their production from a traditional crop to one of the specialty crops if it can reduce sufficiently the risk of those crops *relative* to the traditional crops.

It must be emphasized that crop insurance is not income insurance. The coverage each year is based on the market price that year. For instance, in 1988, the price that was used to convert yield-insurance levels to dollar values was the price in effect in the late winter and early spring of that year.

Two-Price Wheat

The two-price wheat (TWP) program was introduced in 1967 for the purpose of stabilizing the price of wheat to Canadian producers and consumers. Effective August 1, 1988, the TPW program was discontinued. The analysis below indicates the impact of the program when TPW was in effect.

The CWB establishes the domestic price of wheat through the price that it sets for Canadian millers.[6] Prior to August 1, 1967, the domestic price of wheat set by the CWB was equal to the export price. Since that date, the export and domestic prices have diverged. Table C-1 outlines the prices that were

Table C-1

Domestic Price of Wheat: Price Paid by Millers and Received by Producers for Spring Wheat and Durum Wheat, 1967-87

	Domestic price			
	Spring wheat		Durum wheat	
	Millers' price	Producers' price	Millers' price	Producers' price
		($ per tonne)		
August 1/67	71.83	71.83	71.83	71.83
August 1/72	71.83	110.23	71.83	110.23
July 20/73	Export price less 36.74	Export price less 36.74	Export price less 36.74	Export price less 36.74
September 11/73	119.42	119.42 plus maximum of 64.30	119.42	119.42 plus maximum of 91.86
August 1/77	119.42	130.44 plus maximum of 64.30	119.42	130.44 plus maximum of 91.86
August 1/78	119.42	119.42 plus maximum of 64.30	119.42	119.42 plus maximum of 91.86
December 1/78	146.98 to 183.72	146.98 to 183.72	146.98 to 275.58	146.98 to 275.58
August 1/80	183.72 to 257.21	183.72 to 257.21	183.72	183.72
December 1/84	Prices as above – basis altered from in-store Thunder Bay to weighted average (by export volume) of in-store prices at Thunder Bay and Vancouver			
August 1/86	257.21	257.21	257.21	257.21

Source Statistics Canada, *An Overview of Canadian Grain Milling*, Agriculture and Natural Resources Division, Cat. 22-502, 1986.

established for spring wheat and durum sold to domestic millers, as well as the prices that producers received for the grain they sold to the domestic market for human consumption. Note that over the years, the producer price and miller price have not always been equal. From September 1973 until August 1978, producers received a differential payment when export prices were in excess of the price paid by millers. That payment was made by the federal government and was limited to a maximum amount (see Table C-1).

Beginning in December 1978, the program was revised, so that millers paid the export price when it fell within a band established by legislation. If the export price fell outside that band, the upper or lower price (as appropriate) was paid. During that period, producers received the price paid by millers. Effective August 1, 1986, a revised domestic wheat policy allowed the CWB to set domestic prices at between $200 and $404 per tonne. From 1986 until discontinuance of the program in 1988, the CWB priced domestic wheat at approximately $257 per tonne.

The impact of TPW on Canadian agriculture is illustrated in Charts C-6 and C-7.[7] The world price of hard milling wheat in Canada is denoted as p_w; the domestic price of hard wheat is p_d. The domestic demand for wheat is shown as D_d; the supply of wheat from western Canada is S_w; and the supply of wheat from eastern Canada is S_e. At a price of p_d, domestic consumption equals q_d. It is assumed that all the milling wheat produced in eastern Canada is produced for whichever market (domestic or export) is higher-priced. Thus production from this region, q_e, is based on either the domestic price p_d or the world price p_w, whichever is higher. With p_w greater than p_d, output q_e is sold to the export market.

The pooling activities of the CWB mean that western producers face a pooled price of p_p. The pooled price is the average of the domestic price p_d and the world price p_w, weighted by the volumes sold on each of those markets. Faced with a price of p_p, western farmers produce output q_w. The majority of the wheat produced by western farmers is exported ($q_d q_w$).

When the export price is above the domestic ceiling price, eastern producers continue to earn the same level of rents (area $p_w fg$) as they would have earned had the two-price system not been in place. Compared with what they would have earned in the absence of TPW, western producers experience a loss equal to area $p_w abp_p$. While western Canadian producers are worse off, Canadian consumers and millers are made better off; the latter experience a gain in welfare equal to area $p_w cep_d$. The total cost to Canadian society is portrayed as area $abdc - p_p dep_d$.

If the export price is below the domestic price (Chart C-7), the impact of TPW is quite different. As shown, p_d is now higher than p_w. Eastern producers receive a benefit of $p_d ef$ as a result of the program; western producers receive a benefit equal to area $p_p abp_w$. While Canadian producers are better off, domestic consumers and millers are made much worse off, having lost welfare equal to area $p_w cdp_d$.

Chart C-6

Canada's Two-Price Wheat Program

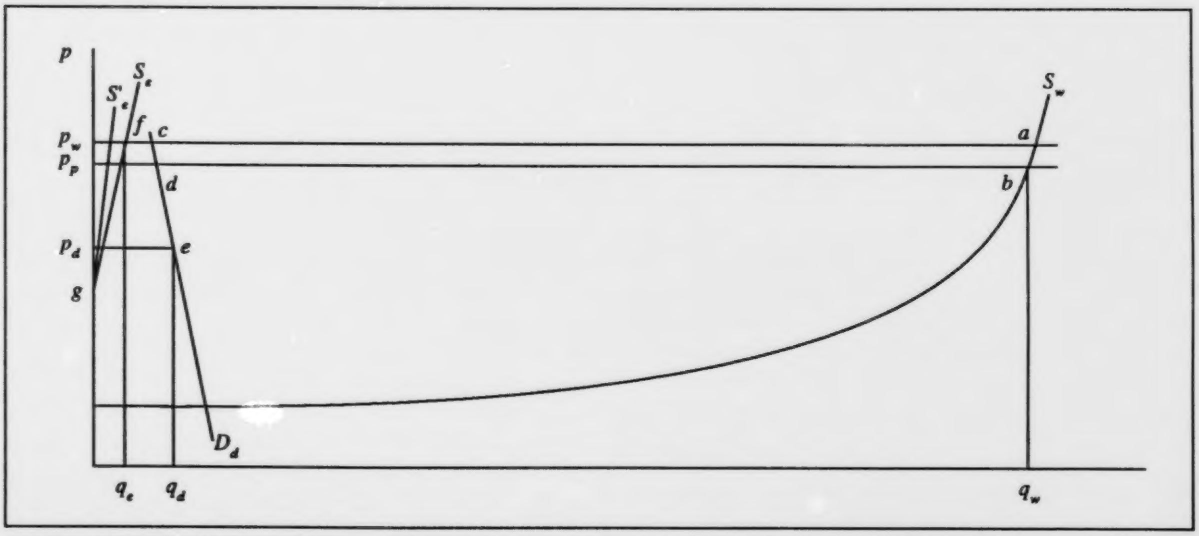
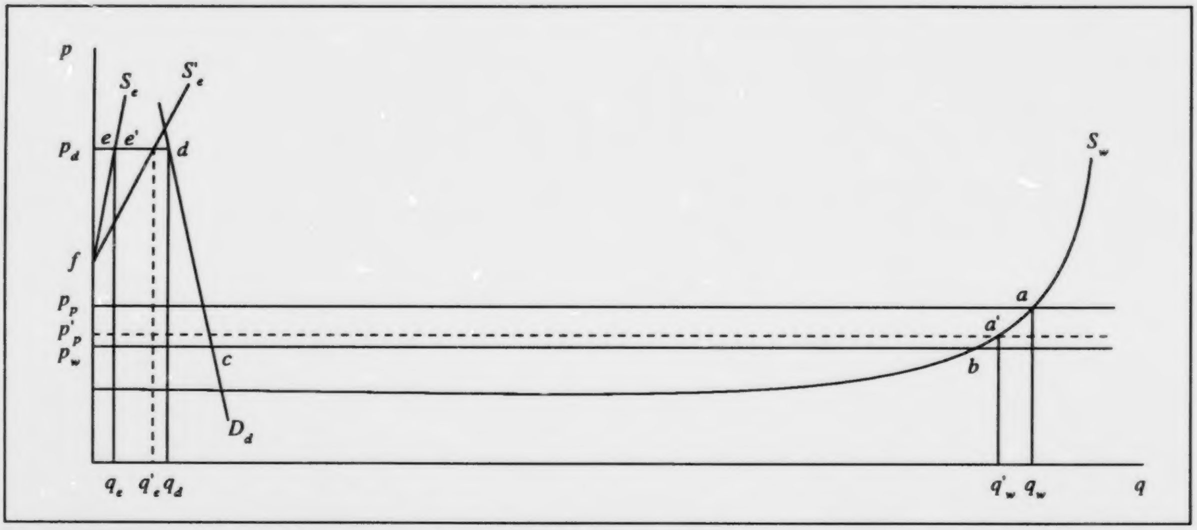


Chart C-7

The Dynamics of Canada's Two-Price Wheat Program



The above examines the impact of TPW in a static sense. Over time, however, the results can be expected to change dramatically. Eastern producers of milling-quality wheat are always able to obtain the higher of either the export price or the domestic price. As a result, producers in eastern Canada can be expected to expand their production of milling-grade wheat when the domestic price is above the world price. This is illustrated in Chart C-7 by the movement of the supply curve S_e to S'_e. As a result of that movement, the production of wheat by eastern Canada increases to q'_e. The result is a decrease in the pooled price faced by western farmers from p_p to p'_p and a decline in production from q_w to q'_w. Although the welfare of consumers and millers is unchanged, there is a significant transfer of welfare from western producers to those in the eastern portion of the country. In particular, western producers lose benefits equal to area $p_p aa'p'_p$, while those in eastern Canada gain an amount equal to $ee'f$.

The dynamic effects of TPW are also likely to be different when the export price is above the domestic price. As mentioned above, hard wheat is not the primary crop of Ontario farmers. In general, soft wheat and corn are the preferred crops, since they have higher yields and are better-suited to the Ontario climate. When the export price of hard wheat rises, the price of those crops also tends to rise. As a result, when the export price of hard wheat rises above the domestic price, Ontario producers tend to find other crops more profitable. That will cause them to shift production out of hard wheat, thereby moving the supply curve inward (S_e to S'_e in Chart C-6). The welfare of consumers is unchanged, while that of western farmers is increased.

From the point of view of western wheat producers, TPW appears to have a number of benefits and costs. Producers clearly benefit during those periods when the export price drops below the domestic price or when the domestic price is increased above the export price as a result of government policy. They stand to lose over time, however, if the domestic/export price differential is maintained, as producers in eastern Canada will respond to the relatively higher domestic price.

Special Canadian Grains Program

A one-billion-dollar Special Canadian Grains Program (SCGP) was announced in December 1986. Under the program, producers of specified crops[8] in all regions of Canada received a payment proportional to the relative price decline attributable to the world grain-trade war. Specifically, the payment to each producer for a qualifying crop was calculated by multiplying the rate per bushel for each crop by the average yield for the crop-insurance region that the producer is located in and by the number of acres seeded to that crop. Payments under the program were made in two instalments: the first $300 million was paid early in 1987; the remaining $700 million, in spring 1987. Payments to any one producer – defined as a CWB permit holder for those in the Prairie region – were limited to a maximum of $25,000.[9]

In December 1987, a second SCGP was announced; it increased the number of eligible crops[10] and included payments for summer fallow – albeit at a reduced rate (one acre of summer fallow was counted as one-third of an acre of crop). Payment to Canadian farmers totalled $1.1 billion, with approximately $900 million having gone to Prairie farmers.

To analyze the impact of the SCGP, consider Chart C-8. The supply of wheat by Canadian producers is shown as S_w, while the domestic demand for wheat is D_d. The nearly vertical nature of the supply curve in the output range q_w reflects the assumption that wheat supply is highly price-inelastic. Assuming Canada to be a price taker in the world wheat market, the combined domestic and foreign demand is shown by curve $D_d cD_w$. In the absence of distortions in the world, the free-trade price is p_w, and exports from Canada are equal to $q_d q_w$. These exports reflect the fact that domestic consumption is limited to q_d as a result of domestic price p_d, which is significantly above the world price. (See the previous section entitled Two-Price Wheat for a fuller discussion of this point.)

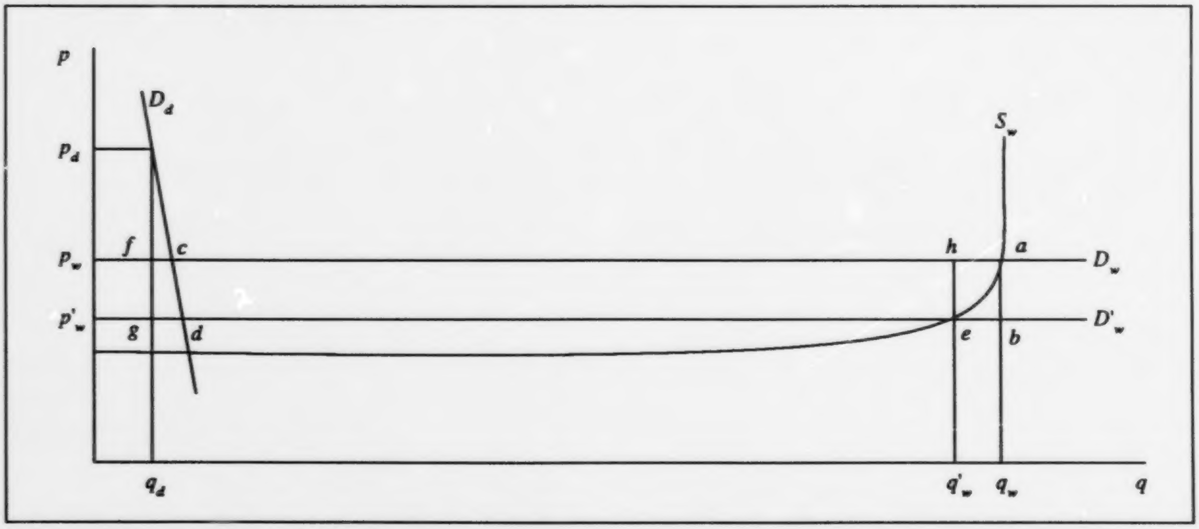
Suppose now that distortions elsewhere in the world cause the world price to fall to p'_w. Total demand (foreign and domestic) now becomes $D_d dD'_w$. With that drop in price and without a deficiency payment, Canadian producers produce an output level q'_w and realize a loss in welfare equal to *gfae*. The rent that is lost by producers is transferred to importing countries; based on the amount that they are now purchasing from Canada, they realize a gain of area *fgeh*.

What is the impact of introducing a deficiency payment? Suppose that the deficiency payment makes up the difference between p_w and p'_w. For the crop of 1986, the SCGP had no effect on production. Although there was much discussion and lobbying for a deficiency payment in the spring of that year, the program was not announced until December. The total transfer to producers as a result of the deficiency payment if there is no cap on producer payments would be area $p_w hep'_w$, since the payment is based on total production. There is no deadweight loss or transfer cost associated with that payment.

While SCGP did not influence production decisions in 1986, it may have had an impact on the acreage seeded in the spring of 1987. Although no follow-up to the SCGP was announced prior to seeding, there was an expectation on the part of some farmers that a similar type program would be put in place (i.e., that payments would be based on seeded acreage only). As a result, some farmers seeded additional acres in order to make sure they qualified for as large a payout as possible. As the analysis in Chapter 8 indicated, however, seeded acreage actually fell in 1987, suggesting that SCGP had little impact on production. One of the major

Chart C-8

Canadian Agricultural Deficiency-Payment Analysis



reasons perhaps is that farmers did not expect SCGP to be permanent and hence did not respond to the program.

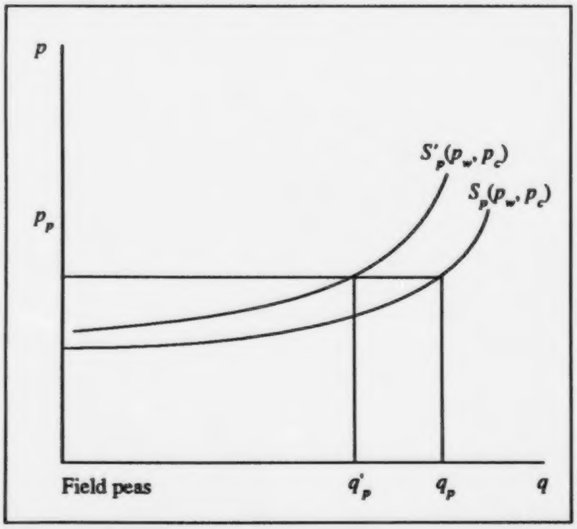
It is useful to analyze the impact of an acreage-based deficiency payment assuming that the farmers had expected it to be permanent. The most likely impact would have been an increase in seeded acreage and/or yields. Increasing the price from p'_w to p_w suggests an increase in output to q_w. A deficiency payment of $p_w - p'_w$ per bushel would transfer to farmers an amount of income equal to $p_w abp'_w$. The cost of that transfer would be area *abe*, since the existence of the deficiency payment encouraged extra production equal to $q'_w q_w$.

It should be pointed out, however, that if the free-trade price p_w is used as the basis for comparison, no transfer cost is incurred. The use of the free-trade price as the comparison point is based on the notion that output level q_w is the correct level of output for a world that wishes to allocate its resources efficiently. In fact, if q_w is the desired output, allowing production to fall because of a price decline would actually lead to a deadweight loss. In short, a fall in the world price because of the actions of other countries in the world does not necessarily imply that Canada should reduce its output level in order to ensure efficient resource allocation.

Finally, it should be noted that if some crops are not included in the permanent deficiency-payment program – e.g., peas and lentils – then the rise in the price of crops like wheat and canola will lead to an inward shift of the supply curve of the specialty crops (S_p to S'_p). That will cause the output of those crops to fall from q_p to q'_p (Chart C-9).

Chart C-9

Canadian Agricultural Deficiency-Payment Analysis with Regard to Specialty Crops



The above results should not be seen as indicative of the changes that will occur as a result of SCGP, however. First, the alterations to SCGP announced in December 1987 will modify the manner in which farmers react to the program. The inclusion of specialty crops means that SCGP has the effect of increasing the prices of all crops. This means that the output of specialty crops should not fall as a result of the program. In addition, the inclusion of payments to summerfallow acreage should mean that farmers will not respond to the higher prices by increasing seeded acreage to the extent that they might have done otherwise. Second, the SCGP is not seen as being permanent, as was assumed in the analysis above. In the absence of a permanent program, farmers are likely to be reluctant to shift their resources in the manner hypothesized.

The *Western Grain Transportation Act*

The *Western Grain Transportation Act* (WGTA) cannot be fully understood without a knowledge of "the Crow Rate." The Crow Rate was an integral part of the settlement of western Canada, having provided for the movement of grain from western Canada to port position and the movement of settlers' effects into western Canada at specified rates. As time passed, the railways contended that the rates charged on grain were too low to provide an adequate and efficient transportation system. Livestock producers and the processors of grain products in the Prairies also argued that the Crow Rate was penalizing their operations.

The *Western Grain Transportation Act* was passed in November 1983, replacing the *Statutory Rates Act* (often called "the Crow Rate"). The purpose of WGTA is to maintain the access of Prairie producers to world grain markets and to protect the income of those producers from higher transportation charges. The Act calls for an annual federal subsidy of up to $658 million, which is to be paid to the railways for transporting all eligible grain from Prairie shipping points to Thunder Bay, Churchill, Vancouver, and Prince Rupert.[11] As a result, Prairie grain producers receive the benefits of the subsidy only if their grain is exported from the region. In years when exports are low because of poor crops or slow sales, the payout under WGTA may be less than $658 million because the volume moved will be small. The subsidy is calculated on a dollar-per-tonne-moved basis and varies with the distance to port within the Prairie region.

The impact on crop production in the Prairie region of totally removing Crow/WGTA is analyzed in Chart C-10. The effect of those programs has been to raise the price of eligible crops. For instance, suppose that as a result of Crow/WGTA, the prices of wheat and canola are raised from p_w and p_c to p'_w and p'_c, respectively. The increase in the price of wheat will cause the supply curve for canola to shift upward and to the left. That will occur, since an increase in the price of wheat – all else remaining the same – will mean that it is more profitable to produce wheat than other crops such as canola. Thus the supply curve for canola will shift inward. The same thing will also happen to the supply curve for wheat.

The output of each crop, q'_w and q'_c, will depend upon the degree of price increase and the amount by which the supply curves shift. Theoretically, however, it can be expected that the output of both crops will increase, because with the increase in crop prices, summer fallow will become increasingly costly from an opportunity-cost point of view. Thus the impact of the Crow/WGTA may be to move acreage out of summer fallow and into crops. The degree to which production of each of the crops is altered as a result of a price increase is given by the own-price and cross-price supply elasticities.

The Crow/WGTA could also be expected to have an impact on the level of livestock activity in the Prairies. Chart C-11 shows the production-possibility frontier for grains and livestock in the Prairie region. Raising the price of grains as a result of Crow/WGTA will cause a decline in the price ratio of livestock to grains. That changes the price ratio *p* to price ratio *p'* – panel (a) – which, in turn, will have the effect of increasing the level of activity in grain from *G* to *G'*, while decreasing the level of activity in livestock from *L* to *L'*.

It should be noted that the above results are based on a situation where Crow/WGTA had been completely removed compared with that where the Crow Benefit was paid to the railways. Suppose now that the Crow Benefit was not removed but, instead, was paid directly to farmers. If the method of paying producers ties the transfer received to the level of output produced, then the effect on the level of output could be expected to remain the same. In other words, farmers will, in effect, be receiving a larger price, and they can be expected to respond to that by increasing output. Thus compared with a situation where the Crow was totally removed, crop output could also be expected to increase if the Crow Benefit were paid to the farmer.

The impact on the livestock sector, however, will be different, since the price they must pay for feed will be reduced compared with the situation where the Crow Benefit is paid directly to the railways. Thus the price ratio of livestock to grains can be expected to increase back to a level like *p* (Chart C-11), and the level of livestock activity can be expected to increase.

Chart C-10

Effect of Crow/WGTA on Crop Production in the Prairie Provinces

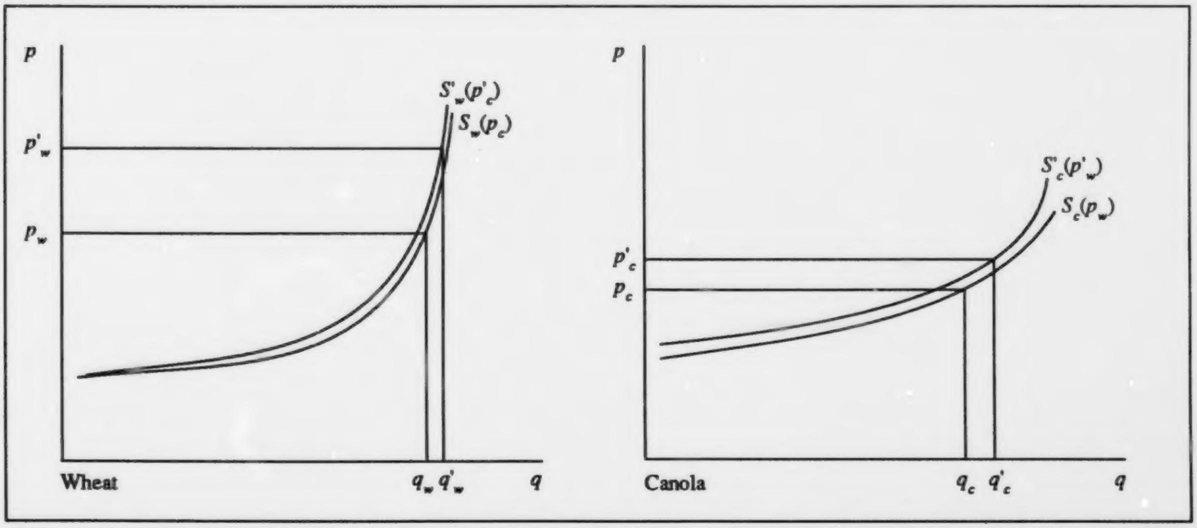
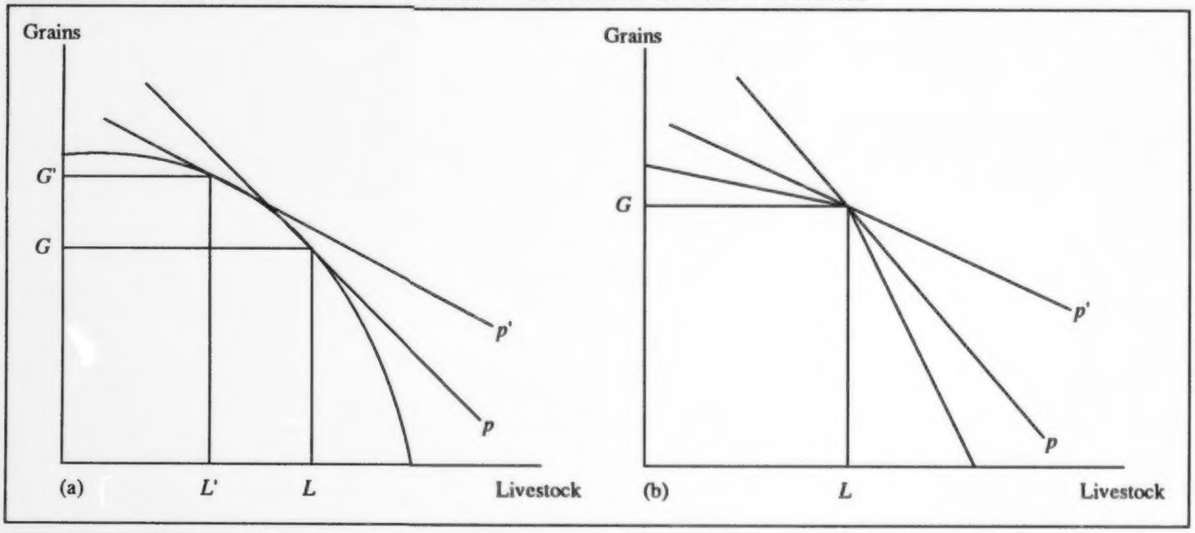


Chart C-11

Effect of Crow/WGTA on Grain and Livestock Production in the Prairie Provinces



The theory presented above shows the expected direction of the Crow/WGTA impact. From an empirical perspective, the magnitude of those effects will depend upon the size of the parameters underlying the supply curves and the production-possibility frontiers, as well as the degree to which price is increased as a result of the Crow/WGTA. For instance, if the price effect of Crow/WGTA is fairly small, the supply curves reasonably inelastic, and the sensitivity of summer-fallow acreage to crop prices low, then the Crow/WGTA will have little impact on the quantity of grains and oilseeds produced. Similarly, if the production-possibility frontier takes the shape outlined in panel (b) of Chart C-11, then a shift in the price line from *p* to *p'* will have little, if any, impact on the relative level of grain and livestock activities. Chapter 8 presented empirical estimates of the magnitude of the changes discussed in this section.

Notes

CHAPTER 1

1 Statistics Canada, *An Overview of Canadian Grain Milling*, Agriculture and Natural Resources Division, Cat. 22-502, Ottawa, 1986.

2 Agriculture Canada, "Challenge for growth: An agri-food strategy for Canada," a discussion paper, Ottawa, 1981.

3 W. H. Furtan, T. Y. Bayri, R. Gray, and G. G. Storey, *Grain Market Outlook*, a study prepared for the Economic Council of Canada (Ottawa: Supply and Services Canada, 1989).

4 Colin Carter, Alex McCalla, and Andrew Schmitz, *Canada and International Grain Markets: Trends, Policies, and Prospects*, a study prepared for the Economic Council of Canada (Ottawa: Supply and Services Canada, 1989).

5 Economic Council of Canada, *Handling the Risks: A Report on the Prairie Grain Economy* (Ottawa: Supply and Services Canada, 1988).

6 It is argued that in order for the GATT process to succeed, some form of compensation will be required for those who lose from freer trade; see A. Schmitz, "GATT and agriculture: The role of special interest groups," *American Journal of Agricultural Economics* (forthcoming).

7 A similar point is made by Gilson in a follow-up comment to the 1969 Federal Task Force on Agriculture, in which he participated; see J. C. Gilson, "The Agricultural Task Force Report: The benefit of hindsight," in *Canadian Journal of Agricultural Economics* 28(1980):1-10.

CHAPTER 2

1 V. C. Fowke, *The National Policy and the Wheat Economy* (Toronto: University of Toronto Press, 1957).

2 Chapters 7 and 8 of this study outline the transfers that have been made to Prairie agriculture over the period 1950-87. As pointed out, it has only been in the 1980s that transfers to Prairie agriculture have been substantial.

3 Under supply management, the price of the commodity is not determined by market forces but, instead, is set according to a cost-of-production formula. To ensure that the price based on cost of production does not give rise to excess output, farmers are limited by a quota in the amount they can produce. These quotas are established by the national supply-management agencies for each of the commodities. For a discussion of the impact of supply management in reducing price instability, see L. J. Martin and T. K. Warley, "The role of marketing boards in stabilizing commodity markets," in *American Journal of Agricultural Economics* 60(1978):878-84.

4 See C. A. Carter and A. Schmitz, "Cattle feeding in western Canada: The economics of its location," *Agribusiness* 2, no. 1 (1986):119-35.

5 See Carter et al., *Canada and International Grain Markets*.

6 A theoretical framework for understanding the downward trend in real grain prices and the volatility of agricultural markets is provided in Chapter 5.

7 See D. E. Hathaway, *Agriculture and the GATT: Rewriting the Rules* (Washington: Institute for International Economics, 1987).

8 The Prairie region relies heavily on the exportation of canola, and acreage planted to canola has increased sharply in the Prairie region in the 1980s. One of the primary markets for canola is Japan. While growth in the exportation of canola in raw form has increased dramatically, the exportation of canola oil has not increased to the same extent. In fact, attempts made to ship canola oil to Japan have generally been marked by failure, largely because of internal protectionist policies.

9 The stability in the world wheat market during this period is seen to be at least partly the result of the dominant role played by the United States and Canada; see A. F. McCalla, "A duopoly model of world wheat pricing," in *Journal of Farm Economics* 48(1966):711-27. With the emergence of the European Community as a major exporter in the 1980s, stability in trading arrangements became more difficult to obtain. Chapter 9 discusses this point in more detail.

10 The 1981 U.S. farm bill had two major components: a target price, and a loan rate. The "target price" is the price received by farmers if they participate in the farm program and remove land from production. The "loan rate" is the price at which producers in the United States can borrow money from the government – more specifically, the Commodity Credit Corporation (CCC) – using their production as collateral. If, when it becomes time to pay back the loan, the world price is above the loan rate, producers will sell the grain at the world price and repay the loan, using the proceeds from the sale. If the

world price is below the loan rate, the producer, in effect, defaults on the loan, letting the government take possession of the production that had been put up as collateral.

The loan rate acts as a floor below which the world price cannot fall. Should the world price fall below the loan rate, producers will continue to supply the government with stocks of grain. This removal of grain from the market will cause the world price to rise; the removal of grain and the rise in price will only stop when the world price is equal to the loan rate. Thus when there is downward pressure on the price because of oversupply, the price cannot fall below the loan rate. The provisions in the 1981 farm bill raised both the target price and the loan rate above previous levels.

11 See the comments by Robert Thompson, "U.S. farm policy: Implications for the future," Proceedings of the 1986 Annual Meeting, Canadian Agricultural Economics and Farm Management Society, *Canadian Journal of Agricultural Economics* 34(May 1987):101-108.

12 It is estimated that the drop in the U.S. loan rate cost the Prairies at least $1 billion in 1986; see A. Schmitz and C. Carter, "A sectoral perspective: Agriculture," in *Perspectives on a U.S.-Canadian Free Trade Agreement*, ed. R. M. Stern, P. H. Trezise, and J. Whalley (Washington: The Brookings Institution, 1987).

13 See Carter et al., *Canada and International Grain Markets*. This volume provides an in-depth treatment of Canada's role in the international grain trade. Programs of the European Community and the United States are discussed in detail, while an analysis is presented of the export-subsidy war in which the grain trade finds itself.

14 See Schmitz and Carter, "A sectoral perspective: Agriculture."

CHAPTER 3

1 In contrast to the 1930s, when very little government support was provided, the crisis of the 1980s has seen federal and provincial governments responding. The magnitude of this response is outlined in Chapters 7 and 8.

2 Not all farmers have benefited as a result of the *Western Grain Stabilization Act*, however. In the 1985/86 crop year, 79.3 per cent of producers in the Canadian Wheat Board's growing area participated in the program. The participation rate of the 1986/87 crop year was 82.5 per cent.

3 According to the Economic Council of Canada, a farm is considered financially stable when – after payment of annual farm cash expenditures, including annual payments on principal and interest – sufficient family income is left to cover basic family living expenses. A farm is considered nonviable when farm expenses exceed family income; see Economic Council of Canada, *Handling the Risks*, Chapter 6.

4 The farm-input price index (1981 = 100) for western Canada was 86.8 in 1980 and 108.0 in 1985; see Agriculture Canada, *Handbook of Agricultural Statistics* (Ottawa: Supply and Services Canada, 1986).

5 Data from the House of Commons Report of the Standing Committee on Agriculture substantiate this. In 1987, approximately 13.2 per cent of farmers classified as grain and oilseed producers were either insolvent or under severe financial stress. That figure compares with 5.5 per cent of dairy farmers, 8.1 per cent of cattle producers, and 10.6 per cent of hog producers. It should be noted that the financial health of hog producers has improved substantially from that in 1985, when 19.4 per cent were either insolvent or under severe financial stress; see Canada, House of Commons, *The $22-Billion Problem: Options for the Financial Restructuring of Farm Debt*, Report of the Standing Committee on Agriculture (Ottawa, July 1988).

CHAPTER 4

1 Saskatchewan Wheat Pool, *A Study of Farm Credit and Land Transfer Policy Options*, Task Force Report, June 1986.

2 See Canada, House of Commons, *The $22-Billion Problem*.

3 See Economic Council of Canada, *Handling the Risks*, Chapter 6, Table 6-7.

4 See Carter et al., *Canada and International Grain Markets*.

5 K. Rosaasen and A. Schmitz, "The Saskatchewan beef industry: Constraints and opportunities for growth," Technical Bulletin BL:84-02, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, March 1984. An additional factor that may have contributed to the movement out of livestock was the introduction of crop insurance in the early 1970s. Farmers generally regard crop insurance as a method of risk reduction, which had previously been provided by livestock production.

6 Saskatchewan Agriculture, *Agricultural Statistics, 1986*, p. 85; and the Grain Handling and Transportation Commission (Hall Commission), *Grain and Rail in Western Canada: Report of the Grain Handling and Transportation Commission*, vol. 1 (Ottawa: Grain Handling and Transportation Commission, 1977), p. 48.

7 This area has been the focus of an article in *The Globe and Mail*; see Andrew Nikiforuk, "Harvest of despair," in the "Report on Business" section of *The Globe and Mail*, Toronto, June 1988.

CHAPTER 5

1 T. W. Schultz, *Agriculture in an Unstable Economy* (New York: McGraw-Hill, 1945).

2 See A. Ulrich and H. Furtan, "An investigation into the rates of return from the Canadian crop breeding program," Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1985 (and references therein).

3 See Carter et al., *Canada and International Grain Markets*.

4 W. W. Cochrane, *Farm Prices: Myth and Reality* (Minneapolis: University of Minnesota Press, 1958).

5 The capitalization formula,

$$V = \frac{R}{r-g},$$

is used extensively in the land-price literature. It has been pointed out, however, that the assumptions behind the use of this formula may not be fulfilled in the empirical data. Nevertheless, the formula does provide a useful way to illustrate the importance of expectations; see J. Stephen Clark and Murray Fulton, "Expectations and land values," a working paper, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1988. The paper also expands upon a number of the other concepts discussed below.

6 P. M. Raup, "The growing sensitivity of U.S. agriculture to world events," in *U.S. Farm Policy in a World Dimension*, Agricultural Experiment Station Publication No. 305 (Columbia, Missouri: University of Missouri, 1983), pp. 37-38.

CHAPTER 6

1 More formally, these four reasons can be expressed as: 1) correction of market failures or incomplete markets; 2) income distribution; 3) provision of public goods or those with increasing returns; and 4) correction of externalities; see J. E. Stiglitz, "Some theoretical aspects of agricultural policies," *Research Observer* 2, no. 1 (1987):43-60.

2 See M. Fulton, "Canadian agricultural policy," in Proceedings of the 1986 Annual Meeting, Canadian Agricultural Economics and Farm Management Society, *Canadian Journal of Agricultural Economics* 34(May 1987):109-26; and Grace Skogstad, *The Politics of Agricultural Policy-Making in Canada* (Toronto: University of Toronto Press, 1987) for a further discussion of the effect of the federal structure of Canada on Canadian agricultural policy.

3 See Ulrich and Furtan, "Canadian crop breeding program." For evidence of similar results in the United States, refer to the pioneering study by Griliches on rates of return from hybrid corn research; see Zvi Griliches, "Research costs and social returns: Hybrid corn and related innovations," *Journal of Political Economy* 66(October 1958):41-51.

4 Ulrich and Furtan estimate that the benefit-to-cost ratio of wheat research in Canada has been 28:69, while that of rapeseed has been 41:61; see Ulrich and Furtan, "Canadian crop breeding program."

5 See Schultz, *Agriculture in an Unstable Economy*.

6 See J. D. Forbes, R. D. Hughes, and T. K. Warley, *Economic Intervention and Regulation in Canadian Agriculture*, published jointly by the Economic Council of Canada and the Institute for Research on Public Policy, Ottawa, 1982. See also A. Schmitz, "Supply management in Canadian agriculture: An assessment of the economic effects," in *Canadian Journal of Agricultural Economics* 31(1983):135-52; and R. E. Just, D. L. Hueth, and A. Schmitz, *Applied Welfare Economics and Public Policy* (Englewood Cliffs, N.J.: Prentice Hall, 1982).

7 For a discussion of resource efficiency and rent seeking in the Canadian economy, see M. D. Faminow and B. L. Benson, "Rent seeking and supply management in Canadian agriculture," in *Canadian Journal of Agricultural Economics* 32, no. 3 (November 1984):548-58; and K. F. Harling and R. L. Thompson, "The economic effects of intervention in Canadian agriculture," in *Canadian Journal of Agricultural Economics* 31, no. 2 (July 1983):153-76.

8 For a discussion of this point in the context of Canadian agriculture, see Faminow and Benson, "Rent seeking and supply management."

9 W. D. Coleman, "Analysing the associative action of business: Policy advocacy and policy participation," in *Canadian Public Administration* 28(1985):413-33.

10 See Schmitz, "Supply management in Canadian agriculture."

11 The impact of agricultural policy on farm structure, rural communities, and the family farm could also be used as criteria for evaluating farm policy. See Organisation for Economic Co-operation and Development, *National Policies and Agricultural Trade*, Paris, 1987. While these criteria are not examined explicitly in the current study, they are nevertheless discussed in conjunction with the criteria that have been put forward.

12 Saskatchewan Wheat Pool, *Farm Credit and Land Transfer Policy*.

13 According to Jay Henryk (the Farm Credit Corporation's assistant manager in charge of lending for Saskatchewan), about 90 per cent of foreclosed land is leased back to the borrower; see M. Marud, "Many farm foreclosures looming," in *Star-Phœnix*, Saskatoon, Saskatchewan, August 25, 1988, p. B7.

14 The idea that changes in asset values do not necessarily reflect changes in productivity is explored further in A. P. Lerner, *The Economics of Control: Principles of Welfare Economics* (New York: Macmillan, 1944).

15 It is interesting to note that while assertions and theories are available as to the effect of U.S. farm programs on U.S. land values, essentially no empirical evidence exists on their impacts; see G. C. Rausser and K. R. Farrell, *Alternative Agricultural and Food Policies and the 1985 Farm Bill*, Resources for the Future (Washington, D.C.: U.S. GPO, 1985).

16 Government of Canada, *Canadian Agriculture in the Seventies*, Report of the Federal Task Force on Agriculture (Ottawa: Queen's Printer, December 1969).

17 Agriculture Canada, *Handbook of Agricultural Statistics* (Ottawa: Supply and Services Canada, 1986).

18 T. K. Warley, "Issues facing agriculture in the GATT negotiations," in *Canadian Journal of Agricultural Economics* 35(1987):515-34.

19 See Carter et al., *Canada and International Grain Markets*.

20 See Carter et al., *Canada and International Grain Markets*.

21 The Cairns Group consists of Argentina, Australia, Brazil, Canada, Chile, Colombia, Hungary, Indonesia, Malaysia, the Phillipines, New Zealand, Thailand, and Uruguay. See Warley, "Issues facing agriculture in the GATT negotiations," for a further discussion of the Cairns Group, the OECD committee, and Canada's position on agricultural trade reform.

22 For an excellent discussion of the issues surrounding the GATT negotiations and the positions taken by the major countries involved, see Warley, "Issues facing agriculture in the GATT negotiations."

23 See Warley, "Issues facing agriculture in the GATT negotiations."

24 See Warley, "Issues facing agriculture in the GATT negotiations."

Chapter 7

1 See Fowke, *The National Policy and the Wheat Economy*. As mentioned in Chapter 2, the federal government was also involved in promoting agricultural development through the use of agricultural research stations and through the provisions of the Crow, which lowered the railway tariffs on settlers' effects shipped to western Canada and on grain moving eastward out of the Prairie region.

2 One of the institutions that originated during that period was the Canadian Grain Commission (CGC). The CGC is the main regulatory body in the Canadian grain industry. Among its functions are the licensing of new grain varieties, the setting of elevator charges and tariffs, and the establishment of the various weights and measures. For many years the CGC refused to license high-yielding, low-protein feed wheats in Canada, even though such varieties were being used in many parts of the world. The concern of the CGC was that unless such varieties could be visually distinguished from the much higher-quality wheat that has become Canada's trademark, licensing would only serve to contaminate, and thus reduce, the quality of Canadian wheat. After pressure from a number of groups, the CGC licensed a wheat variety known as HY320 in the mid-1980s; the Oslo variety was also licensed recently. Thus while producers were legally limited to producing only bread-quality wheats prior to the 1980s, they are now able to include both feed and bread wheats in their production mix.

3 See Fowke, *The National Policy and the Wheat Economy*. In 1949, the CWB's monopoly was extended to oats and barley.

4 The Canadian Wheat Board is designated as the sole exporter of wheat for the Prairie region. It sets an initial price for wheat, barley, and oats, and it regulates farmer deliveries through quotas. The CWB also uses the concept of pooling, in which all producers receive the same price for a given grade of grain regardless of the time of sale during any crop year.

Once initial prices are announced by the CWB, they become price supports, in that if at the close of the crop year, pool revenues from CWB sales are insufficient to cover those prices, differences are made up by the federal government. Until the 1985/86 and 1986/87 crop years, the federal government seldom made a payment into the pool account; and when it did, it was small. In the latter half of the 1980s, however, the federal payments have been significant, exceeding $300 million. In this period, the barley pool has experienced the greatest deficit.

5 See Skogstad, *The Politics of Agricultural Policy-Making in Canada*, for a discussion of some of the policy developments that took place in that period. They included the establishment of the *Agricultural Stabilization Act* (ASA) in 1958 and the Farm Credit Corporation in 1959.

6 See McCalla, "A duopoly model of world wheat pricing."

7 It is argued that with the emergence of Australia as a major producer in the early 1970s, the world wheat market moved from being a duopoly to being a triopoly; see C. M. Alaouze, A. S. Watson, and N. H. Sturgess, "Oligopoly pricing in the world wheat market," in *American Journal of Agricultural Economics* 60(1978):173-85.

It is interesting that the Lower Inventory for Tomorrow (LIFT) program was introduced in 1970. That program was the result of wheat surpluses in the late 1960s, which led the federal government to offer producers incentives to reduce wheat plantings. As a result of the program, $63 million was paid out to farmers, and seeded acreage was lowered from 24.4 million acres in 1969 to 12 million acres in 1970, while production dropped from 652 million to 313 million bushels. The program was in effect for 1970 only. The introduction of LIFT is one indication that in 1970 the government believed that Canada still had sufficient power in the world market to influence the price of wheat.

8 See G. E. Schuh, "The new macroeconomics of agriculture," in *American Journal of Agricultural Economics* 58(December 1976):802-11.

9 See Skogstad, *The Politics of Agricultural Policy-Making in Canada.*

10 See Fowke, *The National Policy and the Wheat Economy.*

11 A. M. Carlos, "Land use, supply, and welfare distortions induced by inefficient freight rates," in *Canadian Journal of Economics* 21(November 1988):836-45. Carlos argues that by lowering freight rates from the monopoly level, the Crow's Nest Agreement increased land use and land rents in the Prairies at the turn of the century. While the Crow Rate had this favourable effect, railway rates were still 44 per cent higher than the socially optimal level. The implication is that even at the Crow rate level, railway rates were too high to result in the optimal level of Prairie agricultural development.

12 For a full discussion of "the Crow," see Skogstad, *The Politics of Agricultural Policy-Making in Canada.*

13 More specifically, WGTA was enacted to apply to defined movements of grain from Prairie shipping points to Thunder Bay/Armstrong, Churchill, and ports in British Columbia. Government payments to the railways under the legislation consist of a fixed annual amount (the Crow Benefit), supplemented by additional payments if the year-to-year cost of moving a tonne of grain exceeds a prescribed percentage or if the freight rate paid by producers exceeds a specified proportion of the average selling price of the major grains. The freight rates charged by the railways under WGTA are adjusted annually – at the beginning of each crop year – by the National Transportation Agency through the application of indices to the actual costs (recalculated at four-year intervals) incurred by the railways for the movement of grain. Over time, the producers' share of the total freight rate would rise in response to higher grain volumes and inflationary cost increases.

14 Agriculture Canada, *Western Grain Stabilization: Update '88* (Ottawa: Supply and Services Canada, Fall 1988).

15 Agriculture Canada, *Western Grain Stabilization: Annual Report, 1986/87* (Ottawa: Supply and Services Canada, 1987). The contributions by producers and government for the 1983/84 crop year (the numbers for that crop year are found in the 1986/87 Annual Report) were calculated by prorating the levies paid during the 1983 calendar year.

16 For a full description of the changes made to the WGSA program, see Agriculture Canada, *Western Grain Stabilization: Update '88.*

17 The farm is assumed to be in RM 344 on class G soil, with hard red spring wheat yielding an average of 34.7 bushels per acre on summer fallow and 26.1 bushels per acre on stubble. The coverage option was 70 per cent: it is assumed that the farmer cultivates 930 acres with a wheat, wheat/summer-fallow rotation – 310 acres of wheat on summer fallow and 310 acres of wheat on stubble.

18 D. Zakreski, "Crop insurance payout likely to hit $500 million," in *Star-Phœnix*, Saskatoon, Saskatchewan, August 24, 1988, p. A1.

19 See Agriculture Canada, "News release on Special Canadian Grains Program," Ottawa, December 9, 1986.

20 Statistics Canada, *An Overview of Canadian Grain Milling.*

21 See B. Duke, "Two-price wheat policy put to rest," in *The Wheat Grower*, Regina, Saskatchewan, July 1, 1988, p. 5.

CHAPTER 8

1 An econometric model is a mathematical and statistical representation of the major economic relationships existing in an economy or industry. The researcher developing an econometric model begins by specifying (in mathematical form) the relations that exist between the economic variables in an economy or industry. These equations are then estimated using statistical procedures. With estimates of the coefficients (i.e., the parameters that relate one economic variable to another) of the model, the researcher is able to examine the impact on the model of changing one or more of the variables. This is known as simulation. If the economic variables chosen are ones that are influenced by policy (e.g., prices), then the results produced by the model when those variables are changed will provide an indication of the impact of the policy.

2 The model is known as the Food and Agriculture Regional Model (FARM) and was developed by Agriculture Canada. It is a large-scale, quarterly forecasting model of Canadian markets for agricultural commodities, food, and inputs. For a discussion of simulation, see note 1 above.

3 The major programs mentioned in Chart 8-1 include: the TWRA (*Temporary Wheat Reserves Act*); the Crow/WGTA (*Western Grain Transportation Act*); the WGSA (*Western Grain Stabilization Act*); the SCGP (Special Canadian Grains Program); the TPW (two-price wheat); crop insurance; and

the payments that were made by the federal treasury when one or more of the CWB pools were in a deficit position.

4 For discussions of the issues involved in the Crow debate, see, for example, J. D. Forbes, *Institutions and Influence in Canadian Farm and Food Policy* (Toronto: The Institute of Public Administration of Canada, 1985); and Skogstad, *The Politics of Agricultural Policy-Making in Canada*.

5 For example, see the Snavely Commission, *Report of the Commission on the Costs of Transporting Grain by Rail*, vol. 1 (1976); Gordon MacEachern, *Retention of the Crow Rate and the Alberta Livestock Economy*, Agricultural Economics Research Council of Canada (Ottawa: AERC, 1978); M. S. Anderson and W. H. C. Hendriks, *A Review of the Crow Rate Implications for Alberta Agriculture* (Edmonton: 1978); and the Hall Commission, *Report of the Grain Handling and Transportation Commission*.

6 Railway-revenue shortfall figures for 1974 and 1977 were obtained from the Snavely Commission numbers reported in D. R. Harvey, "Government intervention and regulation in the Canadian grains industry," Technical Report E/I 6, sponsored jointly by the Economic Council of Canada and the Institute for Research on Public Policy, Ottawa, 1981. Revenue shortfalls for the period 1970-76 were obtained by indexing the 1974 figures, using the CPI, while those for the period 1950-70 were obtained from the calculated 1970 figure, assuming an inflation rate of 8 per cent. The revenue shortfalls for 1978 to 1983 were obtained by taking the difference between the 1977 Snavely figure and the Canadian Transport Commission 1984 WGTA payment and incrementing it by $50.1 per year. The actual WGTA payments for the period since 1984 were obtained from the Canadian Transport Commission's Annual Reports.

7 The total volume of shipments out of western Canada were approximated by examining the amount of each commodity that producers delivered to primary elevators in western Canada. These data were obtained from the table entitled "Producers' marketings by marketing medium, western Canada, primary elevators," in Canada Grains Council, *Canadian Grains Industry Statistical Handbook* (Ottawa: CGC, selected years); and from the table entitled "Primary net receipts of Canadian grain at western country elevators," in Dominion Bureau of Statistics, *Grain Trade of Canada* (Ottawa: Ministry of Trade and Commerce, selected years).

8 The own-price elasticity of supply for a commodity is expressed as the percentage change in production of that commodity as the result of a change of 1 per cent in the price of that commodity. The cross-price elasticity of supply for a commodity is the percentage change in production of that commodity as the result of a change of 1 per cent in the price of another commodity. Thus the cross-price elasticity of wheat in relation to barley is the percentage change in the production of wheat as the result of a change of 1 per cent in the price of barley.

9 The supply elasticities used in this analysis are the combination of an acreage elasticity (the response of acreage to changes in price) and a yield elasticity (the response of yield to changes in acreage). On the basis of empirical estimates, the yield elasticity is assumed to be 1.0; see J. C. Lowe and T. M. Petrie, "Grains and oilseeds supply block of Food and Agriculture Regional Model," Agriculture Canada, Policy and Economics Branch, Working Paper No. 3, Ottawa, 1979.

10 While empirical estimates of cross-price supply elasticities are available for the short run, such is not the case for the long run. As a result, only the own-price elasticities are used for the long-run analysis. Omitting the cross-price elasticities will result in greater production responses than if they were included. As a result, the estimates presented in this chapter can be seen as the upper bounds to the long-run changes in production that would be expected from changes to the Crow/WGTA. In calculating the long-run change in production, a period of five years was chosen as the time frame for the output response.

11 Burt and Worthington estimate the long-run wheat acreage response elasticity for the Great Plains region of the United States to be 1.3; that for the U.S. aggregate is 1.5. For the United States, 24 per cent of the total acreage response occurred in the first year, suggesting a short-run/long-run elasticity ratio of 4.0; see O. R. Burt and V. E. Worthington, "Wheat acreage supply response in the United States," in *Western Journal of Agricultural Economics* 13, no. 1 (1988): 100-111.

Other evidence, however, suggests that these estimates are too large. Sampson and Gerrard, for instance, report a long-run supply elasticity for wheat in Saskatchewan and North Dakota of 0.24; the short-run supply elasticity was estimated to be 0.10. If these estimates are closer to the true long-run supply elasticity, then the results of the analysis in this paper will clearly overstate the impact of the Crow/WGTA on production; see John A. Sampson and Christopher D. Gerrard, "Government interventions and the production of wheat in Saskatchewan and North Dakota: An empirical analysis," in *Canadian Journal of Agricultural Economics* 35(March 1987):1-20.

12 See K. D. Meilke, A. C. Zwart, and L. J. Martin, "North American hog supply: A comparison of geometric and polynomial distributed lag models," in *Canadian Journal of Agricultural Economics* 22, no. 2 (July 1974):15-30; and S. N. Kulshreshtha, "An analysis of the Canadian cattle supply using polynomial distributed lags," in *Canadian Journal of Agricultural Economics* 24, no. 2 (July 1976):1-14.

13 While the total level of livestock production in the Prairie region may not be affected all that much as a result of the Crow/WGTA, the location of production within the region

could be affected to a much greater degree; see K. Rosaasen and A. Schmitz, "The influence of feed grain freight rates on the red meat industry in the Prairie provinces," a study prepared for the Hall Committee of Inquiry on Method of Payment, February 1985.

14 This same point is made in Andrew Schmitz, *Feed Grain and Forage Marketing System for Saskatchewan* (Regina: Saskatchewan Department of Agriculture, June 1985).

15 See Sampson and Gerrard, "Government interventions and the production of wheat in Saskatchewan and North Dakota." See Chapter 9 of our study for a further discussion of how marketing quotas have affected Canada's grain production.

16 As an example, consider two farmers, one with 700 acres and the other with 2,000 acres. Each owns three-quarters of the land outright; the other one-quarter was purchased with the help of a 15-year loan at 12 per cent interest. If land prices were $700 per acre, the annual principal and interest payments for the smaller farmer would be roughly $18,000, while those for the larger farmer would total approximately $51,000. If land prices, however, were $500 per acre, principal and interest payments would fall to approximately $13,000 and $37,000 for the smaller and larger farmer, respectively. Assuming that both of these farmers seeded 60 per cent of their land to wheat, that wheat revenues net of operating costs were $2.00 per bushel, and that the average yield was 25 bushels per acre, the total revenue available for covering debt service, depreciation, and living expenses would total $21,000 and $60,000 for the smaller and larger farmer, respectively. Clearly, then, the large farmer is in a much better position to make a living from farming than the small farmer.

17 The percentage increase in the value of input use attributable to an increase of ρ per cent in production is given by the value of $(1 + \rho)^2 - 1$. Thus if $\rho = 0.07$, the percentage increase in input use is $(1.07)^2 - 1 \approx 0.14$. The formula $(1 + \rho)^2 - 1$ is calculated by finding the percentage increase in the area under a supply curve with constant price elasticity.

18 For farmers with gross receipts of less than $60,000, the levy acts as a reduction in the price of every bushel of grain that is sold. For farmers with gross receipts of more than $60,000, the levy only acts as a reduction in the price of grain for the bushels that were sold as part of the first $60,000. Every bushel sold after that receives the full price. Thus in deciding whether or not to produce one more unit, the farmer with gross receipts of more than $60,000 sees the full market price of the grain.

19 In the 1983/84 crop year, 18.7 per cent of participants under the WGSA had annual grain receipts of over $60,000; by the 1986/87 crop year, the percentage had fallen to 11.8 per cent. The proportion of participants who fall into the group receiving $60,000 or more is also influenced by the fact that participants are defined as CWB permit-book holders. By holding multiple permit books, farmers can increase their ability to contribute to the program.

20 See Schultz, *Agriculture in an Unstable Economy*; and Cochrane, *Farm Prices: Myth and Reality*.

21 Agriculture Canada, *Handbook of Agricultural Statistics*.

22 Crop insurance may also have had an impact on the change in the technology. In particular, if crop insurance reduces the risk that farmers face in growing specific crops, they might be willing to specialize in those crops. Appendix C of this study investigates that question in greater detail.

23 D. Lynne Cameron, "The international effects of the Western Grain Stabilization program," unpublished Master of Science thesis, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, July 1988, and references therein. Also, see the discussion of risk and the impact that it has on production in the section on crop insurance in Appendix C of this study.

24 It should once again be noted that during periods of payout under the WGSA, it does become more financially attractive for some producers to increase the acreage seeded to stubble or to use more inputs. Thus the conclusion that the WGSA is relatively resource-neutral must be tempered by the suggestion that further research on this particular question is needed.

25 See Cameron, "The international effects of the Western Grain Stabilization program."

26 The empirical analysis in the study focuses on a set of regression equations over the period 1966/67 to 1986/87. Cameron includes a dummy variable in her acreage regression equation to capture the impact of the WGSA on reducing risk. The dummy variable takes on a value of one for the crop years 1976/77 to 1986/87 and zero otherwise. Since that period encompassed a great deal of the time frame during which technology changes may have occurred, it would appear to be difficult to sort out what effect, if any, the dummy variable is capturing.

27 Agriculture Canada, *Western Grain Stabilization: Annual Report, 1986/87*.

28 Farmers would be indifferent to joining a program that was financed entirely by producer levies and self-insurance if they had access to perfect capital markets and expected to receive benefits that precisely matched the levies that they had to pay. Since neither of these situations is likely to exist, farmers would have to receive some additional benefit from the program to entice them to enter.

29 H. Furtan and M. Fulton, "Government transfers to agriculture: Central Canada and the Prairies," a study prepared for the Economic Council of Canada.

30 Ian McCreary, "An inquiry into the wealth and income of farmers," unpublished Master's thesis, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1986; see also I. McCreary and H. Furtan, "An investigation into how agricultural policies affect the distribution of farm income," unpublished paper, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1987.

31 Canada West Foundation, *Western Canadian Agriculture to 1990*, Special Task Force Report (Calgary, Alberta: Canada West Foundation, 1980).

32 It has been suggested that farmers do discount government payments when determining land values; see Andrew Schmitz, Jim Vercammen, Hartley Furtan, and Murray Fulton, "Boom, bust, cycles and Ricardian rent in agriculture: A case study of the Canadian Prairies," Working Paper, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1988, for a detailed examination of this question.

33 R. A. Schoney, "1986 costs of producing crops and forward planning manual for Saskatchewan," Department of Agricultural Economics, University of Saskatchewan, Saskatoon, and FARMLAB, FARMLAB Bulletin: FLB 86-01 (September 1986).

34 Agriculture Canada, "News release on Special Canadian Grains Program."

35 See McCreary and Furtan, "How agricultural policies affect the distribution of farm income."

36 See Schmitz et al., "Boom, bust, cycles and Ricardian rent in agriculture."

37 Jim Vercammen and Murray Fulton, "Canadian two-price wheat and the economic beliefs of farm interest groups," Working Paper, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, 1988.

38 The domestic market for hard red spring wheat represents 10 to 15 per cent of total Canadian production. If Ontario increased its production sufficiently to obtain a domestic market share of 20 per cent (assuming that Prairie production remained constant), total Canadian production would increase by approximately 4 per cent.

39 The Canadian Wheat Board establishes the domestic price and must supply material to this market. Producers outside the CWB area are free, however, to sell their output to whatever market they wish.

40 Canada, House of Commons, *The $22-Billion Problem. The House of Commons' report mentions that the legislative changes in the Bank Act took place in 1977 but this appears to be a misprint.*

41 Canada, House of Commons, *The $22-Billion Problem.*

42 Canada, House of Commons, *The $22-Billion Problem.*

43 Canada, House of Commons, *The $22-Billion Problem*, p. 33.

CHAPTER 9

1 It is ironic that one of the factors causing the rise in prices of the 1970s was the "Russian grain robbery"; yet it is the Soviets, along with other importing countries, who are reaping the benefits of the international grain-trade war.

2 Canada, House of Commons, *The $22-Billion Problem.*

3 This, of course, was unlike the situation during the Depression, when farm income and land values tracked each other reasonably well; see Schmitz et al., "Boom, bust, cycles and Ricardian rent in agriculture."

4 Canada, House of Commons, *The $22-Billion Problem.*

5 Canada, House of Commons, *The $22-Billion Problem.*

6 The Standing Committee on Agriculture notes that since the early 1980s, private financial institutions have used concepts of "cash-flow" lending when evaluating farm loans. Despite this move, however, most institutions still use market-value accounting statements as part of their decision-making process. The Committee also points out that performance-based lending, which expands on the short-term concept of cash-flow evaluation, is receiving increasing attention, particularly in the United States; see Canada, House of Commons, *The $22-Billion Problem.* Since purchasing land is a long-term decision, it would appear to be appropriate to use evaluation tools that reflect the long-term prospects and trends rather than any short-term fluctuations.

7 It should be noted that the expectations expressed in Agriculture Canada, "An agri-food strategy for Canada," were not shared by everyone. For instance, in a comment on that discussion paper, Menzie and Brinkman remarked: "However, as an indicator of expectations for Canadians from the agriculture sector, it would appear extremely optimistic, falling short of reality both in some of its assumptions and its projections." See Elmer E. Menzie and George Brinkman, "Canada's agri-food strategy: An appraisal," in *Canadian Journal of Agricultural Economics* 30(July 1982):995-1005.

There is evidence that policy makers in the United States during the early 1980s also believed that prices were going to continue to increase. See Carter et al., *Canada and International Grain Markets.*

8 See Schmitz et al., "Boom, bust, cycles and Ricardian rent in agriculture."

9 It has been argued that the delivery-quota policy of Canada is both theoretically and empirically a more effective form of production control than the U.S. system of acreage set-asides; see Sampson and Gerrard, "Government interventions and the production of wheat."

10 In formal economic terms, this shift in strategy can be interpreted as Canada realizing that it was more of a price taker than it had previously been. From oligopoly theory, it is a well-known result that a price-taking firm will produce a greater level of output than will a firm which believes it has some degree of market power.

11 See Sampson and Gerrard, "Government interventions and the production of wheat."

12 Over the 13-year period 1960-72, Canada's share of the world wheat trade averaged 21.4 per cent. During the period 1973-85, this figure fell to 17.5 per cent. More specifically, in 1971, Canada's share of the world wheat market was 21 per cent. By 1975, this share had fallen to 16 per cent. Although it rebounded to 20 per cent in 1982-83, by 1985 Canada's share had slipped to 18 per cent. See Carter et al., *Canada and International Grain Markets*.

13 See Carter et al., *Canada and International Grain Markets*.

14 See Sampson and Gerrard, "Government interventions and the production of wheat."

15 See Carter et al., *Canada and International Grain Markets*.

16 For a description of the programs in these countries, see Carter et al., *Canada and International Grain Markets*.

17 For a discussion of this point, see Carter et al., *Canada and International Grain Markets*, Appendix E.

18 Hartley W. Furtan and George E. Lee, "Economic development of the Saskatchewan wheat economy," in *Canadian Journal of Agricultural Economics* 25(March 1977):15-29; and A. F. McCalla and A. Schmitz, "Grain marketing systems: The case of the United States versus Canada," in *American Journal of Agricultural Economics* 61(May 1979):199-212.

19 The possibility that farmers may also discount government programs in making land valuation decisions further complicates the matter. See note 7.

CHAPTER 10

1 See Carter et al., *Canada and International Grain Markets*.

2 For instance, the deficit in the WGSA fund was $1.5 billion as of December 1, 1987. In the summer of 1988, the government of Canada officially wrote off $750 million of this amount.

3 See Carter et al., *Canada and International Grain Markets*.

4 See Carter et al., *Canada and International Grain Markets*.

5 See Carter et al., *Canada and International Grain Markets*.

6 See Carter et al., *Canada and International Grain Markets*.

7 See Schmitz, "GATT and agriculture: The role of special interest groups"; and Carter et al., *Canada and International Grain Markets*.

8 Consider, for example, what appears to be a completely decoupled program. Each farmer in a country receives a fixed amount of income transfer regardless of the level of income they have or the level of output they produce. On the surface, this program would appear to not have any effect on agricultural output. However, since some level of output is required to be classified as a farmer and to receive the income transfer, overall output is likely to be increased as farmers and others attempt to obtain the subsidy. The problem is that an income transfer to farmers raises the profitability of farming. If people respond to this increased profitability by entering the industry, the impact of the program is to increase output from farming and reduce it in other sectors. Only if all producers in the country were to receive a fixed transfer of the type described above would production not be distorted. If all producers receive a transfer, however, then the initial goal of transferring income to agriculture has not been met.

Within agriculture a similar problem is present. The income transfer program examined above does not attempt to target any particular farmers or sectors in the industry. It is usual, however, for policy makers to be concerned about who receives the benefits of a program. Suppose that the government wishes to stabilize the income of farmers by transferring income to those who have low incomes in a particular year. If these low incomes are a result of low prices of particular commodities, then making this transfer will influence the relative profitability of the crops or livestock being produced. While this may not affect production immediately, in the long run it could result in higher production than would have been the case for those commodities whose price has fallen. For a succinct statement of the view that lump-sum transfers are not possible, see W. J. Baumol, *Superfairness* (Cambridge, Mass.: MIT Press, 1987).

The crux of the above problem is that it may never be possible to separate concerns regarding who should receive income support and assistance from those regarding the level of production. This is similar to the tact taken by Gardner when he asks the question of how governments can most efficiently transfer incomes. See B. Gardner, "Efficient redistribution through commodity markets," in *American Journal of Agricultural Economics* 65(1983):225-34.

9 While it appears that the 1981 Farm Bill may have led to increases in U.S. production, this was not the case for the 1985 Farm Bill. See Carter et al., *Canada and International Grain Markets*.

In addition to acreage set-asides, marketing quotas might also be considered. In the previous chapter, it was argued that marketing quotas may be relatively more effective than acreage-reduction schemes at reducing output. For a detailed account of the effects of these two types of programs in the 1960s and 1970s, see Sampson and Gerrard, "Government interventions and the production of wheat."

10 A. Schmitz, "United States agricultural trade: Where are the gains from trade?," invited paper, Western Agricultural Economic Association Meetings, Hawaii, July 1988.

11 See Schmitz, "United States agricultural trade."

12 In welfare economics, the view that a policy change is recommended if no one is made worse off and at least someone is made better off is known as "the Pareto Principle." The view that everyone could be made better off, even though compensation is not actually made, is known as "the Compensation Principle." See Schmitz, "GATT and agriculture: The role of special interest groups."

Appendix A

1 The estimate of between $25 and $50 was assumed after discussion with financial personnel and farm-management specialists. The change in wealth is calculated by multiplying the number of acres by the change in land price.

Appendix B

1 See Schmitz et al., "Boom, bust, cycles and Ricardian rent in agriculture."

2 See H. Shalit and A. Schmitz, "Farmland accumulation and prices," in *American Journal of Agricultural Economics* 64 (1982):710-19; and Canada, House of Commons, *The $22-Billion Problem*.

Appendix C

1 "Consumer surplus" is correctly defined as the area below the Hicksian compensated demand curve and above the price line. The area under the standard Marshallian demand curve is equal to the area under the Hicksian curve when the income elasticity is zero; see Just, Hueth, and Schmitz, *Applied Welfare Economics and Public Policy*.

2 B. Gardner, "Causes of U.S. farm commodity programs," in *Journal of Political Economy* 95(1987):290-310.

3 J. Spriggs, "Economic analysis of the Western Grain Stabilization Program," in *Canadian Journal of Agricultural Economics* 33(March 1985):209-29.

4 G. C. Van Kooten, A. Schmitz, and H. Furtan, "The economics of storing a non-storable commodity," in *Canadian Journal of Agricultural Economics* (1988).

5 Coverage levels of 60 or 70 per cent of the average yield for a particular area can be chosen by a producer. Coverage on stubble crops varies from 60 to 75 per cent of the summerfallow coverage.

6 Although it is the CWB that actually establishes the domestic price, it does so on the basis of legislation passed by the federal government.

7 The material in this section was taken from Vercammen and Fulton, "Canadian two-price wheat and the economic beliefs of farm interest groups."

8 The qualifying crops are: wheat, barley, oats, rye, mixed grains, corn, soybeans, canola, flax, and sunflower seeds.

9 Agriculture Canada, "News release on Special Canadian Grains Program."

10 The eligible crops are: wheat, barley, oats, rye, mixed grains, corn, soybeans, canola, flax, sunflower seeds, dry peas, mustard, lentils, canary seed, safflower, buckwheat, field beans, faba beans, honey, and alfalfa for processing. Not covered are grains seeded for silage or green feed, forage seed, and hay.

11 The provision for payment to the railways is subject to review. As discussed in the text of this study, a number of livestock groups wish to see the Crow Benefit paid directly to the producers.

List of Tables and Charts

Tables

3-1 Acreage, Yield, and Variable and Fixed Costs of Wheat Production, by Cropping Method, Brown-Soil Zone, Saskatchewan, 1986 11
3-2 Grain Income, Canadian Wheat Board Area, Crop Years 1979/80 to 1986/87 12
4-1 Number of Cattle and Hogs on Farms Reporting, Prairie Provinces, Selected Years, 1971-86 21
8-1 Real Price of Wheat and Barley, With and Without Crow/WGTA, Prairie Provinces, 1975-87 45
8-2 Short-Run, Own-Price, and Cross-Price Supply Elasticities for Major Crops in the Prairie Region, 1985 46
8-3 Long-Run, Own-Price Supply Elasticities for Major Crops in the Prairie Region, 1985 46
8-4 Production of Wheat and Barley With and Without Crow/WGTA, Prairie Provinces, 1975-87 47
8-5 Livestock Supply Elasticities with Respect to Feed-Grain Prices, Selected Regions, 1975-87 48
9-1 Real Interest Rates in Canada, 1970-87 71
9-2 Forecasts of Grain and Oilseed Prices Made by Agriculture Canada in April 1978 73
A-1 Calculation of Multipliers 88
C-1 Domestic Price of Wheat: Price Paid by Millers and Received by Producers for Spring Wheat and Durum Wheat, 1967-87 100

Charts

1-1 Real Farm Price of Wheat, Prairie Provinces, 1926-87 1
1-2 Real Value of Farmland and Buildings, Prairie Provinces, 1941-87 2
1-3 Real Realized Net Farm Income, Prairie Provinces, 1926-87 3
2-1 Cash Receipts from the Sale of Selected Farm Commodities, Ontario and Quebec, and Prairie Provinces, 1986 6
2-2 Average Cash Receipts from the Sale of Selected Farm Commodities, Manitoba, 1983-87 6
2-3 Average Cash Receipts from the Sale of Selected Farm Commodities, Saskatchewan, 1983-87 7
2-4 Average Cash Receipts from the Sale of Selected Farm Commodities, Alberta, 1983-87 7
4-1 Average Capital per Farm (Deflated to 1981 Dollars), Prairie Provinces, 1926-86 15
4-2 Fertilizer Expenditures as a Proportion of Total Farm Expenditures, Prairie Provinces, 1970-86 16
4-3 Pesticide Expenditures as a Proportion of Total Farm Expenditures, Prairie Provinces, 1970-86 17
4-4 Level of Debt, Prairie Provinces, 1971-84 17
4-5 Ratio of Outstanding Farm Debt to Realized Net Farm Income, Prairie Provinces, 1971-86 18

4-6 Acreage Seeded to the Six Principal Crops, Prairie Provinces, 1926-87 19
4-7 Production of Wheat in the Prairies, 1926-87 19
4-8 Number of Hogs and Cattle on Prairie Farms, 1941-87 20
4-9 Number of Farmers, Ontario and Prairie Provinces, 1926-86 21
4-10 Average Farm Size, Ontario and Prairie Provinces, 1926-86 22
4-11 Proportion of Farmers Reporting Off-Farm Income, Ontario, Quebec, and Western Provinces, 1971-86 22
7-1 Net Transfers to Prairie Producers under Selected Government Programs, 1950-87 36
8-1 Net Transfers to Prairie Producers under WGTA and All Major Government Programs, 1950-87 44
8-2 Average Farm Price of Prairie Wheat and Barley, With and Without Crow/WGTA, 1950-87 45
8-3 Production of Wheat in the Prairies, With and Without Crow/WGTA, 1950-87 47
8-4 Number of Cattle Slaughtered in the Prairies, With and Without Crow/WGTA, 1950-87 49
8-5 Number of Hogs Slaughtered in the Prairies, With and Without Crow/WGTA, 1950-87 49
8-6 Ratio of Crow/WGTA to Realized Net Farm Income, Prairie Provinces, 1950-87 51
8-7 Value of Prairie Farmland and Buildings, With and Without Crow/WGTA, 1950-87 52
8-8 Ratio of Value of Farmland and Buildings to Realized Net Farm Income, Prairie Provinces, 1950-87 53
8-9 Net Payments to Prairie Producers under WGSA and SCGP, 1976-87 54
8-10 Realized Net Farm Income, With and Without WGSA, Prairie Provinces, 1976-87 56
8-11 Value of Prairie Farmland and Buildings, With and Without WGSA, 1976-87 58
8-12 Realized Net Farm Income, With and Without SCGP, Prairie Provinces, 1976-87 61
8-13 Value of Prairie Farmland and Buildings, With and Without SCGP, 1976-87 61
8-14 Realized Net Farm Income, With and Without Crop Insurance, Prairie Provinces, 1960-87 63
8-15 Realized Net Farm Income, With and Without Two-Price Wheat, Prairie Provinces, 1965-87 64
8-16 Real Prairie Farm Debt Outstanding, by Major Financial Institution, 1971-86 67
9-1 Realized Net Farm Income, With and Without Major Government Programs, Prairie Provinces, 1950-87 70
B-1 Effect of an Increase in the Price of Wheat 89
B-2 Increased Demand for Land as a Result of a Higher Wheat Price 89
B-3 Rents and Expected Rents as a Result of a Change in the Price of Wheat 90
B-4 Increased Demand for Farmland Because of Inflation 90
B-5 Effect of Relative Price Changes on Grain and Livestock Production in the Prairie Agricultural Sector 91
B-6 Effect of Government Policy Intervention on Rents in the Prairie Agricultural Sector 91
B-7 Effect of Rising Input Costs on Rents in the Prairie Agricultural Sector 92
C-1 Canadian Agricultural Policy Analysis and Welfare Weights 94

C-2 Effect of WGSA on Prairie Crop Production When Crop Prices Are High 96
C-3 Effect of WGSA on Prairie Crop Production When Crop Prices Are Low 98
C-4 *Ex Ante* Supply Curves for Wheat, Canola, and Field Peas in the Prairie Provinces 99
C-5 The Effect of Crop Insurance on Expected Output in the Prairie Provinces 99
C-6 Canada's Two-Price Wheat Program 101
C-7 The Dynamics of Canada's Two-Price Wheat Program 102
C-8 Canadian Agricultural Deficiency-Payment Analysis
C-9 Canadian Agricultural Deficiency-Payment Analysis with Regard to 103
Specialty Crops 104
C-10 Effect of Crow/WGTA on Crop Production in the Prairie Provinces 105
C-11 Effect of Crow/WGTA on Grain and Livestock Production in the Prairie Provinces 106

Economic Council
of Canada

Conseil économique
du Canada